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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

■ *Synthetic Resins* ■ *Casein* ■ *Rubber* ■ *Cellulose Compositions* ■

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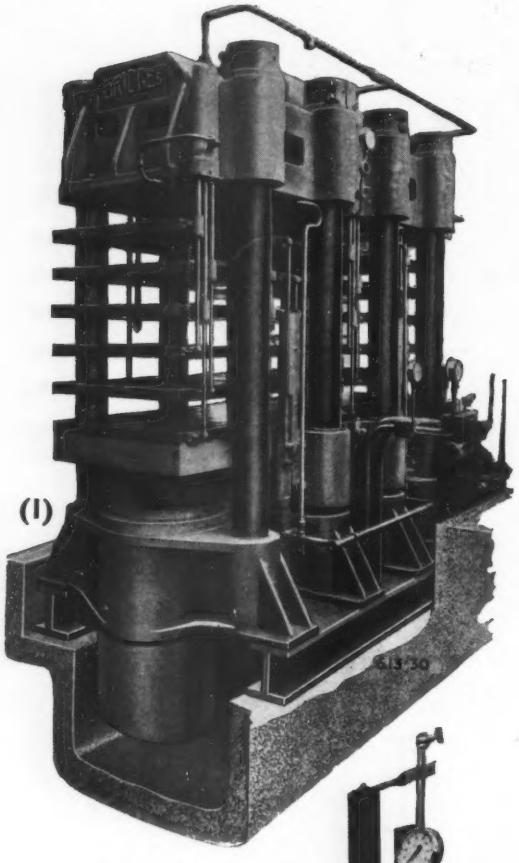

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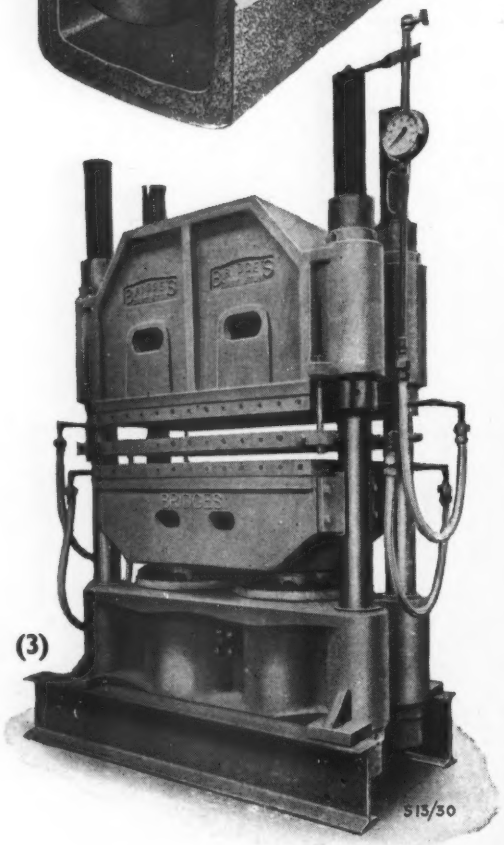

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

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PROGRESS IN PLASTICS PRODUCTION

DURING the past few months we have received certain information that gives a good indication of the general progress of the plastics industry, and in what ways expansion, normal and abnormal, is taking place.

Last month we were invited to visit the remarkable factory of Ekco the famous producers of radio parts and cabinets, at Southend-on-Sea, and, truth to tell, it left us open-eyed and open-mouthed, for everything is made within the factory. The public knows of the Ekco cabinets of plastics well enough. We need only mention that some 300 tons of Bakelite and similar moulding powders are used yearly, and that there are five 1,500-ton presses of enormous dimensions turning out the large cabinet mouldings. There are numerous smaller presses for producing the myriads of other units which go to make up the interior of the sets.

Now, it is inevitable that with the introduction of such machinery and the consequent experience in large, intricate and high-class moulding, that further progress be looked for in other directions. In other words, Ekco is expanding its business to include mouldings for other purposes, and will mould for the "trade." During an interview with the sales manager of this new branch, Mr. H. Vic. Verrells, we were informed of some of the ideas on which the new scheme will be based. First, only high-class goods will be manufactured, and, secondly, it is intended that, so far as possible, large mouldings only will be made.

As for the first proposal, we have nothing but praise, for by such means only will satisfactory business accrue and give results, moreover, that will raise the standard of plastics in general in the eyes of the buying public. Moreover, from the production of large mouldings will come important experience for development that to-day we cannot even surmise at, and it is from such works that we put much of our hope for the future. Plastics have a long way to go yet.

Similarly, we welcome Souplex, Ltd., of Morecambe, the producers of fine-quality mouldings for their own safety razors. So large has the output of their products become, and so wide has their experience been developed, that they, too, have decided to mould for outside inquirers. If this company expands its present manufacture of high-class goods of exquisite colouring and excellent workmanship, then we shall have little fear for the moulding industry.

At one time the advent of new manufacturing concerns into the industry was regarded with alarm, especially when those concerns had little or no knowledge of the difficulties of the trade and merely relied on cutting prices and consequently poorly executed mouldings. For the experienced works with imagination, the field is wide and open.

Yet a third company appears on the scene. This time it is one of a rather different category, yet no less welcome. Hydro-Plastics, Ltd., is now erecting a factory at Putney, where manufactures of a type new to this country will be produced. One of the directors is Mr. G. Eyssen, whose name is already familiar to readers of this journal. Among the proposed manufactures is that of a felt-like material impregnated with special emulsions of synthetic resin to produce mouldable goods of great strength and special properties. A reference was made to this material by Mr. Eyssen in his paper before the Institute of Mechanical Engineers, an abstract of which is given on page 233. New plant is also to be installed at these works for the production of new materials in thermo-plastics of the vinyl chloride group.

The last case we may consider is of an entirely different type. It is an inquiry from a North of England company without any experience of plastics or their moulding, of the advisability of entering into the industry, and for description of the type of machinery required. The reasons for undertaking plastics manufacture are very good—in fact, we can conceive of none better. That this company was willing to consider it—or, at least, perceive the necessity of considering it—shows a praiseworthy foresight into the future. With permission we give the following abstract of their letter:—

"Owing to the coming of plastic mouldings the demand for our products, wood door handles, which we have manufactured for about 50 years, is rapidly decreasing. Could you suggest a way in which we

could use our small factory profitably without a very large outlay on new plant?"

The company is prepared to consider the manufacture of door knobs and finger-plates at the rate of more than 1,000 units per day. Two important facts stand out in this instance—first, an old-established firm with a thorough knowledge of the trade and a long-established clientele, and, secondly, that although plastic door knobs and similar furniture are rapidly replacing wood, and probably metal, there is ample room for further development, especially for door furniture of good quality and, if we may add, for high-class moulded goods built on a metal casting or insert.

We are not, of course, in the position to give gratuitous advice on the cost of installing plant for new works. This is the sphere of the consultant or of the manufacturers of plant, to whom we have referred the inquirers. But we certainly give such movements our sympathy and promise of general help.

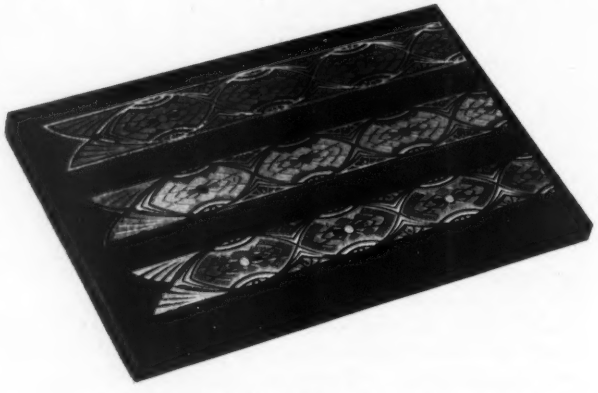
Decorative Effects

AT various periods we have described the efforts at utilizing plastic materials in one form or another to obtain certain decorative effects. Until recently there has been little of a sensational nature to report, although the effects to which we have given publicity have been exceptionally beautiful. We may mention the description of Mr. Oliver Bernard's work in architecture—the beautiful laminated plastic panelling in the cocktail bar of the Strand Palace Hotel, amongst others, and the photograph we recently published of the metal inlaid-plastic door in the Kansas City Municipal Auditorium. These early efforts, if we may so call them, were of single colours, and multicolours as a decoration were obtained only by the juxtaposition of different colours. Recently more complicated effects, such as marbling and of inlays of different colours, have been attained, but the greatest advance has been the production of real pictorial designs.

This type of laminated plastic is an enormous step forward, and although yet in its early stages is full of promise. We have reached a point where an artist may paint his picture in the colours he pleases, and from it may be produced a sheet absolutely imperishable that may be cleaned without deterioration. The process is at present secret, but, broadly speaking, it is similar to the production of ordinary laminated material. The sheet of paper or linen is painted with the designed pattern in colours and is impregnated with synthetic resin. This latter is then "cured" under heat and pressure and bonded to a stiff backing. Special resins, such as the amino plastics, are employed because of their transparency and absence of colour. The accompanying photograph, which shows a modern conception of a Tyrolean scene, is an example of what can be done. The background is of a delicate egg-shell blue, while the figures are painted white, brown, red and green. Much of the work of research has been carried out by Bakelite, Ltd., with whose permission we have obtained the photograph. At an early date we shall reproduce this, and several other examples we have, in the natural colours, so that the value of the process will be seen.

Coloured design in plastics by Bakelite Ltd.

Yet another form of decoration that has come our way is one which serves an entirely different purpose. We believe that this has not yet been seen on the market, although its potentialities are obvious. We refer to metal inlays in moulded goods—inlaying carried out at the same time as the moulding process and very different from the method of inlaying with metal the door in the Kansas City Auditorium, where laminated material was cut and metal strips inserted.



Example of metal inlays on a box cover.

In the new method a filigree of metal is placed at the bottom of the mould, powder is added and the usual moulding process is carried out. Very beautiful effects with copper, silver and other metals are obtainable; an excellent example of what might be compared to Castillian or Damascene work is seen in the accompanying photograph of the lid of a box. Here, there is the red of copper, the yellow of gold, and the white of silver against a black background of Bakelite to give a delightful result. This example has been loaned to us by Mr. Andrew Fraser, of Inlay Mouldings, Ltd., who has the licence to manufacture in this country.

British Rayon Production

The figures for production of rayon made in this country during September show a very substantial increase over August's figures. There is shown a rise of 3,600,000 lb., the September total being 14,400,000 lb. So far, the total for the 1937 production is 115,690,000 lb., as compared with 109,110,000 for the corresponding period in 1936, a rise of over 6 per cent. The world production of staple fibre rayon for the first half of 1937 was 248,575,000 lb.

Science has produced the non-creasing shirt and tie.

The Tale of a Shirt and a Tie and a Skirt

IT seems a far cry from the moulded resin goods which generally fill these pages to men's haberdashery. Scientifically, however, there is no unbridged gap, for the chemist merely regards the process of synthetic resin making as a method of producing a solid, almost indestructible material that in its finished state is insoluble in water and most chemicals, and also possessing many other remarkable properties. He then proceeds to devise methods of utilizing this previously non-existent material in diverse ways. Historically, moulded goods came first and then laminated goods. The latter are particularly suggestive of developments on other but similar lines, for he has, in effect, produced a sheet of paper or linen which, by impregnation with resin, has become a sheet resembling a hard varnished film, resistant to most liquids.

Hence, the impregnated sheet of cotton, impregnated to a far less extent than that used for electrical work, can become a shirt, and, provided that it still looks like a shirt, can be washed and rewashed without removing the resin protection. The primary reason for impregnating cotton sheet for shirting is not, of course, to protect it against acids. Indeed, with the small quantity of resin that is used, there would be no real protection.

Non-creasing Fabrics

We have imparted yet another valuable property to the fabric. Cotton and similar fibres have the great drawback of creasing or crumpling badly and of being unable to regain their original smoothness. Wool, on the other hand, is very resilient, and, while it can be creased, within a reasonable time it assumes its original shape. This is due to the peculiar structure of the fibre, or possibly of the structure of the molecules that make up the fibre. It seemed feasible that the introduction of substances such as synthetic resin into cotton would impart to it similar non-creasing properties. At the same time, it would certainly withstand, within reason, continual washing, an essential part of the idea.

Amongst the first of the textile manufacturers to carry out such a process was Tootal Broadhurst and Lee, who, about six or seven years ago, brought out a patent for imparting non-creasing properties to textile fabrics by impregnating them with phenol (carbolic acid) formaldehyde, or with amino resins. Their non-creasing ties are now widely sold.

The dipping of a fabric into a solution containing a finished or partly finished synthetic resin would not be suitable. Such a process would not enable the resin to reach the interior of the fibres, but merely give a coating. Instead, the raw materials for resin making, for example, carbolic acid and formaldehyde, are dissolved in water and the cotton fabric is soaked in this solution, which easily enters into the cells. Not until then is the water removed by drying, leaving the carbolic acid and the formaldehyde behind. The sheet is then heated and the synthetic resin is formed within the fibre. Similarly the amino resins are formed in cotton fabric by making a solution of urea and formaldehyde in water and dipping the sheet into the solution. The sheet is

then squeezed free from excess solution and then heated. By these and similar methods, cotton and linen are rendered non-creasable, stronger and more durable. The finished goods "handle" and drape better.

In more recent patents, rayon silk and velvet are also so treated, while rayon staple fibre may be made to resemble wool closely in its tendency to curl.

Water-repellent Fabrics.

A few weeks ago there took place in a well-known West End restaurant a scene that at first sight might have been translated from one of Zola's "low-life in Paris" novels. Two undoubted ladies began flinging drink (ex-bottle) at one another's skirts. What was apparently an unseemly brawl, was in fact a scientific experiment. The liquid (actually water) merely flowed off the dress fabric without wetting it. The material had been treated with a new chemical—a water repellent. This new substance has been discovered in the laboratories of Imperial Chemical Industries, Ltd., and is known by the trade name of Velan. The constitution of it is at present secret, but it is known that in the fibre it forms a resin which prevents the absorption of water, not merely because the cells or pores are filled with the resin, but because the latter repels the water.

Of course, the basic idea of waterproofing is not new. Chemists have long sought such a substance. Waterproofing by means of a rubber coating has been a practice for many years, but the result is merely a non-permeable coating which prevents even the passage of air, and so is not very desirable. Again, raincoats have long been treated with special metallic soaps which have fairly good water-repellent properties. Unfortunately, such raincoats must be re-treated after washing, and the metallic soaps attract or, rather, retain dirt very easily. The process, obviously, has never been used for dresses.

It is claimed that Velan-treated fabrics can be repeatedly washed without losing their water-repellent properties. Moreover, for the first time, delicate fabrics made of cotton and silk can be processed without detriment to their appearance, thus removing many of the housewife's worries.

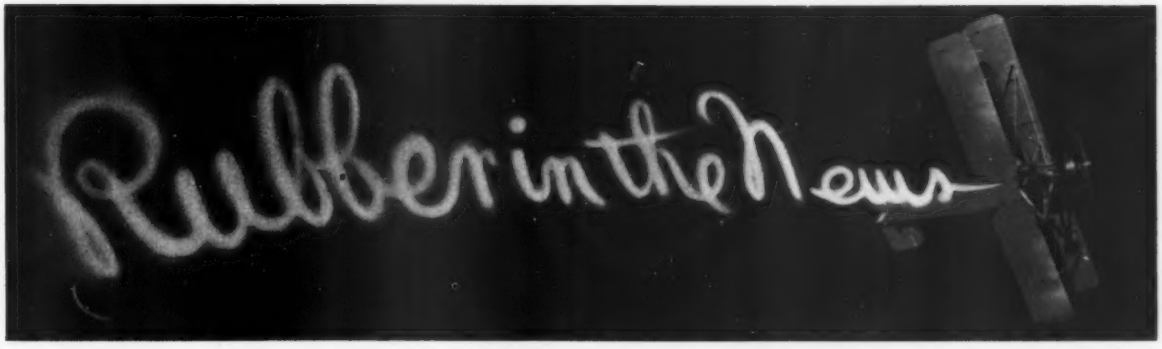
If all clothing—dresses, suits, hats and overcoats can be adequately treated, we shall certainly be able to chorus with truth, "Never mind the weather!"

How water retains its globular form on a water-repellent cloth.

Resin-impregnated Wood

Further to our notes on this subject last month, we have received another interesting photograph of an additional form of construction patented and developed by the De Havilland Co. for aircraft work and carried out at the works of Halila, Ltd., Slough.

Intended for what is known in aircraft technique as "stressed skin" covering, it consists of Canadian birch laminations impregnated by the JIC process and secured to an Onazote backing or stabilizing medium. The Onazote, made from rubber impregnated with nitrogen gas, gives an extreme rigidity to the wood even when pressed into shapes of acute angular form. The Onazote layer is seen in the photograph as a flat sheet inside the curved laminations. Readers may remember that in the June issue of *Plastics* we gave some of the unique properties of Onazote.



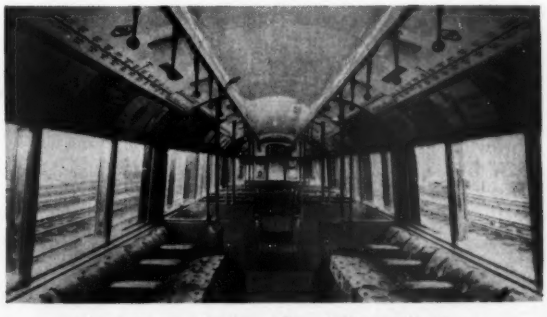
Rubber for New Ink Pack

Known as the Skrip container, this neat and novel pack, made of ebonite by W. A. Sheaffer Pen Co., Port Madison, Iowa, U.S.A., is now on the English market.

The new ebonite ink container.

The container is unbreakable and should prove a great boon to travellers and others who do not want to rely on Post Office inkwells for refilling their fountain pens.

There is no necessity to buy one of these safety inkwells every time it requires replenishing, as the W. A. Sheaffer Pen Co. sell bottles of their special ink for the purpose.



Experimental streamlined Piccadilly line tube train showing new straphangers.

Straphangers Prefer Rubber

In the new experimental streamlined tube trains for the Piccadilly line, the London Passenger Transport Board have substituted rubber straps for the ordinary leather type. The former are specially designed so as to afford an easy grip, and one great advantage which they possess is that they do not soil the hands or gloves; when leather gets damp with perspiration it is liable to cause stains which are difficult to remove.

If these new straps meet with the approval of the City rush, it is probable that they will be generally adopted by the Board.

Dunlopillo at the Paris Exposition

The stand illustrated was the centre of a good deal of attention and a considerable number of inquiries were received regarding Dunlopillo mattresses and upholstery.

The method of manufacturing Dunlopillo cushioning, as this new revolutionary material is called, is striking in its simplicity and curiously reminiscent of the cookery book. The milk-like juice of the rubber tree, latex, suitably compounded, is beaten into a froth by means of a giant "egg whisk," the resulting airy lather is poured into moulds of the varying shape required and is "cooked," that is, vulcanized, by passing the sealed moulds slowly through boiling water. The consistency of Dunlopillo cushioning can be varied, according to the purpose for which it is required, by the duration of the whisking process.

The "cooking" finished, the "cakes" are stripped from the moulds, dried and trimmed, and represent complete units ready for covering as seats, back squabs, arm-rests, loose cushions, mattresses and every other upholstery unit required.

Dunlop's attractive little stand at the Paris Exposition.

The latest Nash, with instrument board, wheel and knobs of beige-coloured plastics.

THINGS SEEN AT EARLS COURT

Lessons to be Learnt at the Motor Show

THE British motorcar manufacturer seems to have learnt nothing about the value of plastics as a medium for decoration. He probably knows everything there is to know about them from an electrical or mechanical point of view, and, of course, cannot help using them from battery boxes to gear wheels, but there his knowledge appears to end.

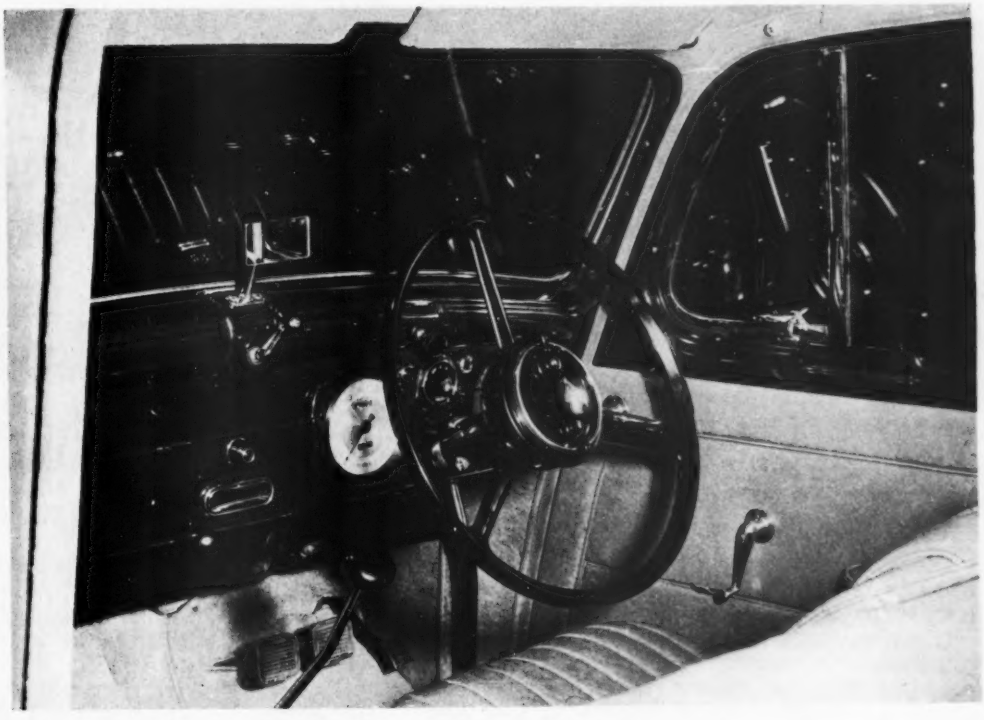
The interior of the British car is, on the whole, a dull affair of dark sombre colour, unrelieved by any enlightening splash. It is possibly this dullness that helps to prevent our exports attaining their proper heights. Latest reports show that Australia, New Zealand and India are buying more British cars for our workmanship is, indeed, superlative. Nevertheless, it is the American car with that little extra something that the others haven't got that still holds sway in many of the Dominions and Colonies.

Our manufacturers rightly point to the engine and the chassis as being the most important parts of the car, but seem to add that really nothing else matters and that interior decoration is merely ostentation. From a modern sales point of view this is wrong. They seem to forget that the good engine is taken now as a matter of course, and that what pays and will pay in greater proportion, is the comfort—physical and mental—that is added for the delectation of the customer. The motorist who wants a rich-looking dashboard is not necessarily snobbish or even ostentatious. It is pleasing in itself and soothes the mind with a sense of well-being. Deceptive? Yes, maybe, but we all like it.

No doubt motorcar factories will yet receive the light, for they have shown it before. We all remember in the earlier days with what excitement was received the little Bakelite ashtray, thrown in gratis with the car. The gratitude of the public was, indeed, pathetically genuine.

As an example of what we hope to see in the British car, let us look at the interior of the Nash, an American car which was on view at Earls Court last month actually before it was shown in the United States. Let us presume that it is no better in performance than an English car of the same horse-power. Yet, confronted by the two, we are willing to bet that a customer, especially if she were a woman, as customers so often are now, would look more appreciatively at the Nash.

The general colour motive of the seat, door panels and dashboard is a rich brown, but a miraculous finishing touch is the panel of a moulded or cast-plastic of

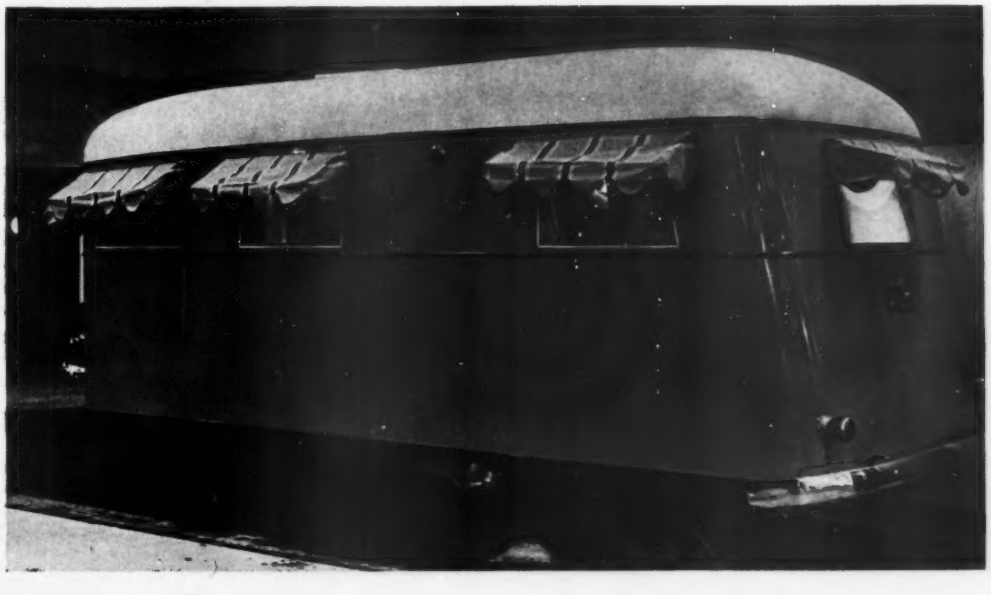


The instrument board and window frames of the Humber Snipe are of synthetic resin.

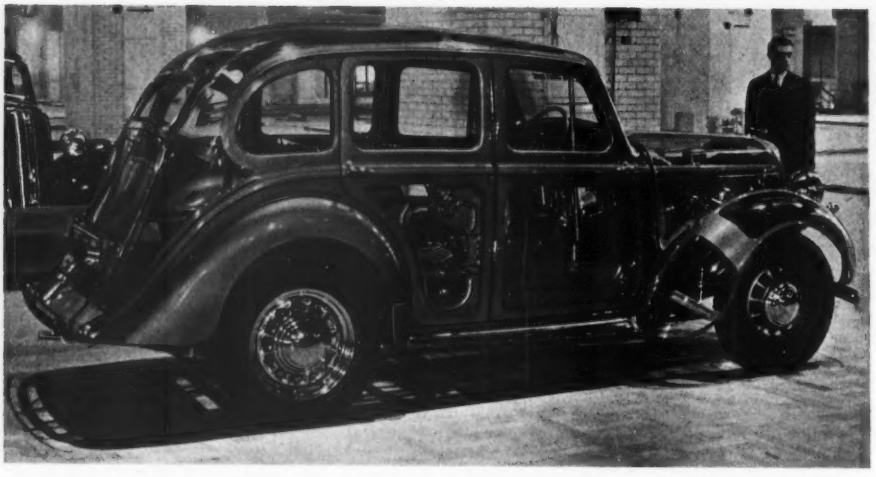
beige, which sweeps almost the whole length of the dashboard and holds the speedometer, clock, etc. It has a wonderful rich beauty, more than any stone, with far lovelier translucency than any marble we have seen. Yet it is warm and smooth and caressing to the touch. The door handles and knobs were of the same material and colour.

British manufacturers always seem to reply to criticism by saying, "Oh, the British public don't want it." Frankly, we believe they do. We are in an age that wants and needs colour.

Luckily, there are one or two bolder producers who are experimenting, not unfortunately, with plastics as a means of bringing colour into our motoring lives, but as a sensible replacement of painted steel or wood. In a recent issue of *Plastics* there was a description of the new Ford with a dashboard and window frames of phenol resin, moulded by H. E. Ashdown (Birmingham), Ltd. At the Earls Court was seen the new Humber Snipe with a clearly designed instrument board in the same material of a dark hue. The new Hillman Ten is also fitted with plastic window frames by H. E. Ashdown, Ltd. Let us hope that within a short time we shall see some other courageous manufacturers who are not afraid of introducing a spot of colour. The motorcar is not merely a mechanical means of moving from point to point; it is also a means of enjoyment. Yet it would appear that we are often expected to enjoy ourselves in a horseless hearse. This is, of course, an exaggeration, but not unreasonably so.



The modern caravan. An untouched field for plastics, outside and in.



The Hillman Minx body ghosted with insert sheets of Perspex to show internal construction.

The Call of the Caravan

One of the most interesting sections of the Motor Show was that confined to the comparatively new movement of caravanning. We have seen at odd times some of these new trailers hitched to cars, and have been enthusiastic over the possibilities of the new "sport" of camping. At Earls Court there were several remarkable examples, some priced as high as £400, the price of a good motorcar.

The mind of those who have placed these on the market is curiously reflected in them. What stands out a mile is that these caravans are mere replicas in every way of town life. They are mere flats in a small space on wheels, and bear little relation, except in certain essential details, to the important functions of the caravan.

For example, would it be entirely stupid to consider this delightful new habit as a means of escape from town life? Isn't it just that? Should not the far-sighted caravan builder build for a motoring fraternity of Peter Pans who refuse for a few hours to grow up?

The outside of some of the vehicles on show was promising—but the inside! One was actually panelled throughout in dark mahogany, with the type of electric table lamps that usually grace the tables of a St. James's Street restaurant. What a chance there is here for laminated plastics of light colours. And since caravanning must mean freedom from drudgery, ease of cleanliness and brightness, what a field for plastics of

Examples of the new transparent distributor cap on the stand of Remax. It is made of amino resin.

all kinds and shapes, and utensils. The very body with its straight sides, differing so largely in design from the motorcar itself, could be built quite readily from laminated sheet.

One maker, if we remember rightly, boasted that the entire caravan was made of steel! All very well for a gangster off duty, but surely not for the modest citizen with a medium-powered car.

Patience: plastics will yet come into their own.

Seeing Through It

A novel method of display was seen at the Hillman stand, where one of the cars of this company was fitted with almost its entire frame made of Perspex, the transparent methacrylate resin. Engine, interior, seating and luggage accommodation were clearly visible from the outside, and gave better than any other possible method a comprehensive view of the entire layout of the car. The new Opel was also shown by a similar method.

A New Distributor Cap

It is rare that we have to report novelties of the normally invisible interior economies of the motorcar, but the outstanding example at the Motor Show was the new Remax distributor cap of transparent amino plastic. Not only is it transparent, but the makers claim that it is definitely more efficient electrically than the type of resin normally used for electrical equipment. Practically all ignition troubles start under the distributor cap, the chief offender being the condenser, causing burnt plugs, faulty functioning of plugs, and finally breakdown of the ignition coil. The new Remax cap permits a clear vision of what is happening, such as excessive arc-ing across points, tracking between pick-up contacts, faulty timing, etc. A definite diagnosis can now be made while the engine is running. Mr. White, of Ray Mouldings, Ltd., Ealing, London, W.5, designed the cap.

New Card Packs

Card-players in the United States (and there are, apparently, several millions of them) have an opportunity of coming into contact with some excellent decorative plastics nowadays in the form of containers for the packs of cards.

Among several examples on the American market, perhaps the most interesting is that used by the Kem Card Sales Corporation, of New York, for it is moulded in du Pont's transparent plastic, Lucite. The designer,

G. Franklin Whitman, Junr., has taken advantage of the clear material to allow the design on the card backs to show through, and the box is allowed to form a frame to this design, its own decoration consisting only of the firm's badge, in a condensed form, at the top centre—between the two packs, which are accommodated side by side.

The walls of the box are of varying thickness, having a ripple on the inside though they are smooth on the outside. The law that plastic mouldings should be of uniform thickness as far as possible is unimportant here, since the box is decorative and not intended to undergo great strains. It is moulded by the Gorham Company.

A less expensive line is a container of cream-coloured plastic with a black lid, used by Bridge Headquarters, Incorporated. This has attractive glossy surfaces with a pattern on the top which centres about an initial; all the letters of the alphabet are available, and so any customer can choose his own initial.

Dimensions of the box are such that it can also be conveniently used for cigarettes.

New Tube Closure

Closures for collapsible tubes have gained great popularity in the past few years, but usually they have done nothing more original than to copy in shape their metal forerunners.

Something new is the moulded closure on a tube for mascara (eye-black) recently placed on the market by Pinaud, Ltd., cosmetic manufacturers of London and Paris. The tube has a cap as wide throughout as the top of the tube itself; there is no narrow neck, and so the sides of tube and closure form an unbroken line. The effect of unity between them is heightened by use of a glossy black finish on both, and the whole thing should succeed in its intention of appealing to women.

Incidentally, each tube of Pinaud's mascara is boxed with a minute brush alongside it in the carton, and the handle of this is another plastic product—of the translucent coloured type often used for toothbrushes.

WHERE PLASTICS AND DIE CASTINGS ARE COMBINED

by Plastiplume

Steering wheels in many American cars have acetate moulded rims (Tenite in this instance), horn buttons to match and die-cast hubs.

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It is not surprising, then, that there are cases in which die castings and plastics are used more or less interchangeably, although they are less common than might be anticipated. What is more important is that they are frequently used in complementary assemblies, each performing functions for which the other is not well suited. Plastics have, of course, many properties which die castings do not possess, but the reverse is also true. Each, therefore, is used by the well-informed designer where its respective properties meet requirements, and it often happens, as will be demonstrated presently, that each benefits by the use of the other

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Plastics possess such advantages as pleasing colours, light weight, freedom from corrosion and general chemical inertness, require no applied finish, are poor conductors of heat and hence are pleasant to touch, and are good dielectric materials. They can be had in transparent, translucent or opaque forms, are suitable for machining as well as for moulding, and lend themselves to economical fabrication, the moulded forms coming from the mould practically ready for use. In strength the plastics are adequate for many uses, but are definitely inferior in this respect to die castings made in Zamak alloy—known in Great Britain as Mazak alloy—the most widely used zinc alloys of high purity type employed in large tonnages in U.S.A. Some forms of plastics are quite flexible and some are quite shock resistant, but these forms are rather expensive and some of them quite difficult to work. The commoner and less expensive forms, as well as some more expensive types, are inclined to brittleness and are likely to be broken if subjected to shock.

Die castings, besides their advantage in strength, which is often a controlling factor in their selection, are readily polished to a high lustre, are easily plated or given coloured coatings but ordinarily require no applied finish unless exposed to view, are heavier than plastics (some exceptions), which is an advantage in some applications, and can sometimes be made in complex forms which it is not feasible to mould. Although sometimes subject to corrosion, die castings are non-rusting, and are readily protected against corrosion by suitable treatment when required. Their cost per pound is often lower than for plastics, but this may be offset by their greater weight and the need for finishing.

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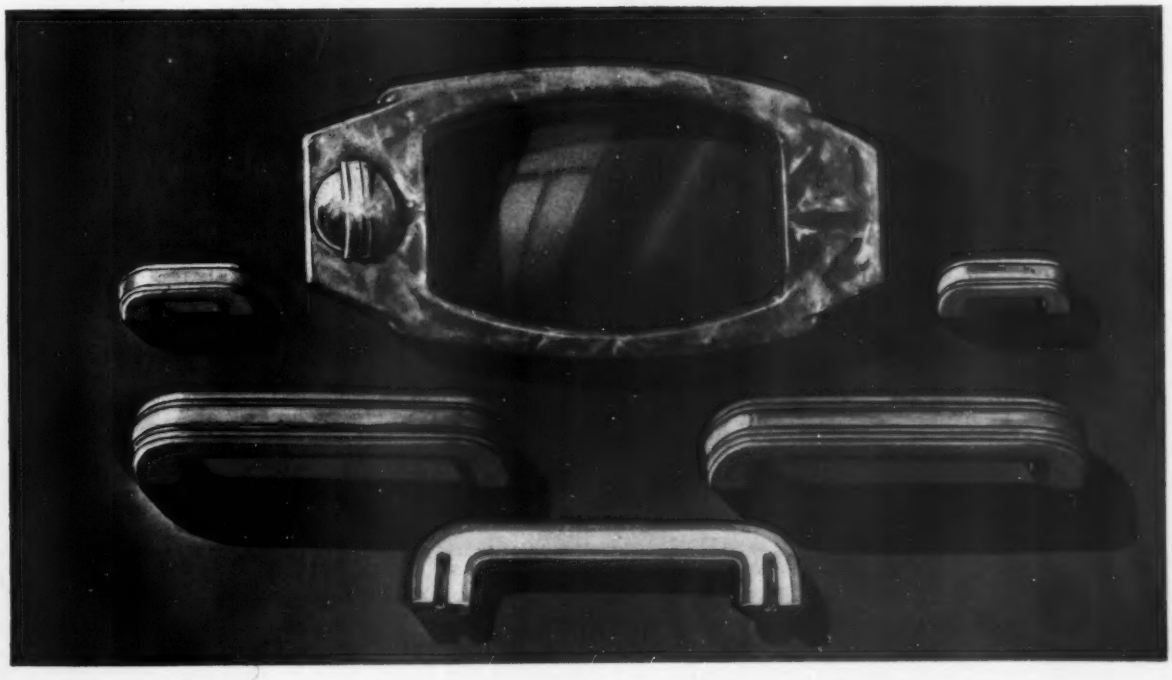

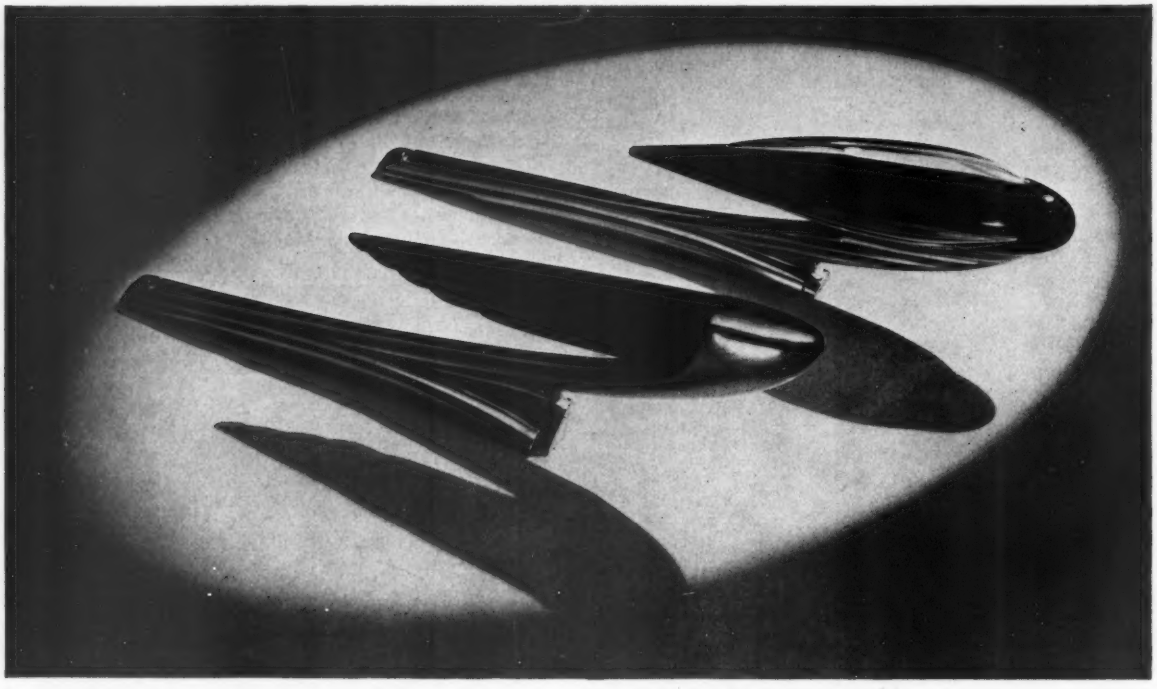

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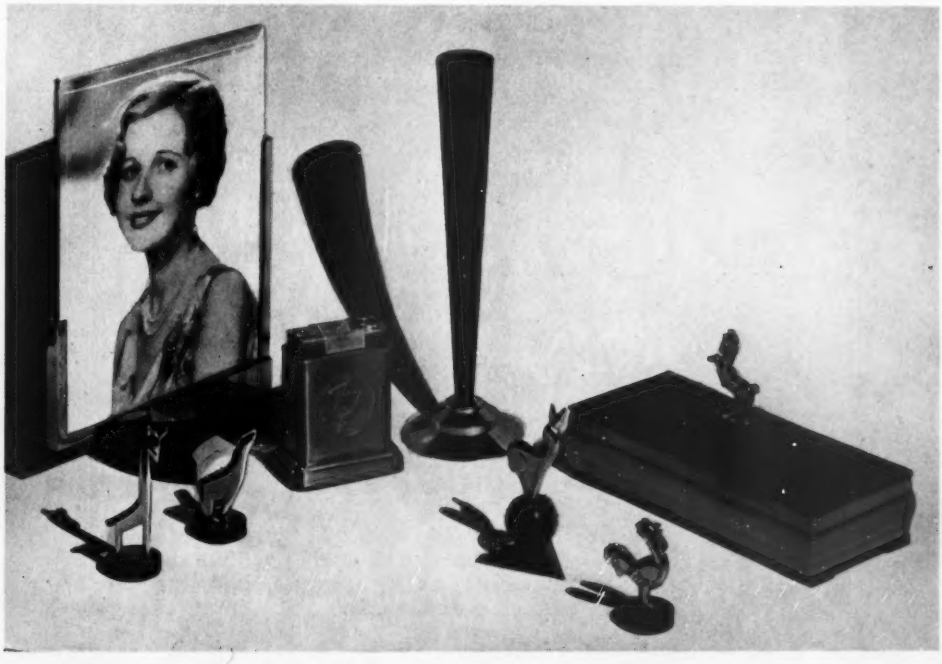
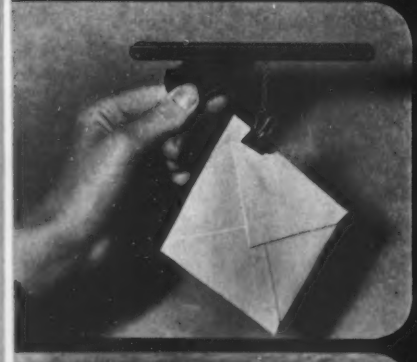
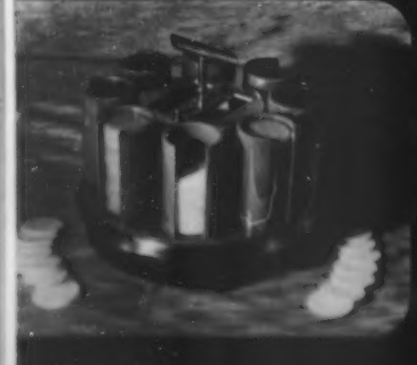
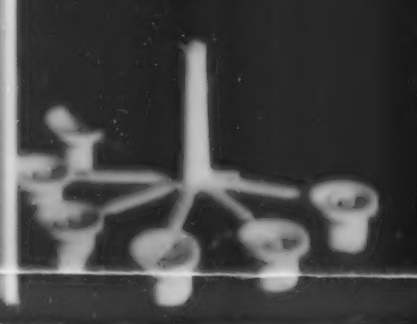


Group of ornamental objects combining plated zinc alloy castings and moulded or cast plastics.







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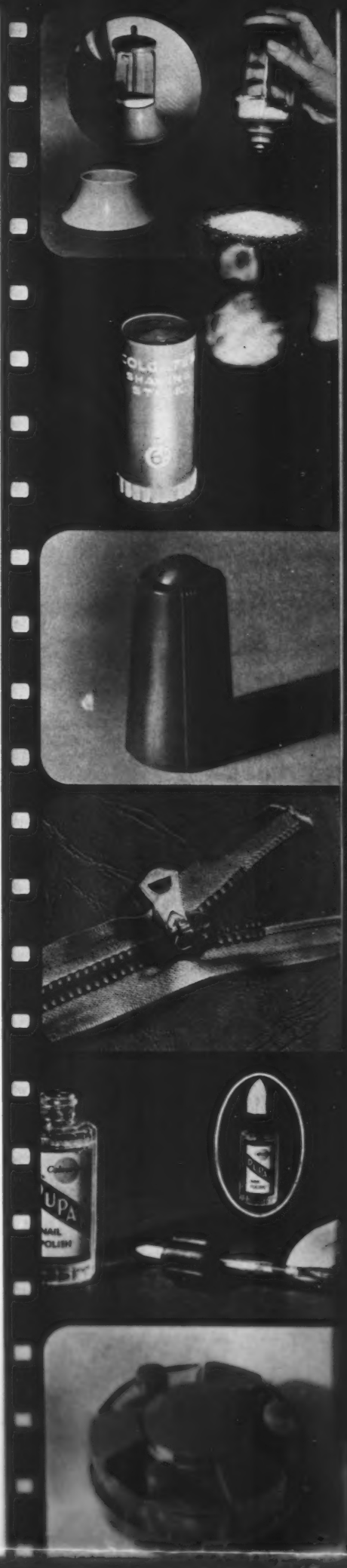
THE Chic-Pak Boudoir Stand, "Onslow Court" model, has been specially designed by C. Keith Thomas so as to achieve an ideal of compactness and attractiveness. The stand is moulded of amino resin by Ray Mouldings, Ltd., Ealing, W.5, and distributed to the chemist trade by S. Maw, Son and Sons, Ltd., whilst Messrs. Calmon and Neate, Ltd., are wholesalers for the hairdressing trade.



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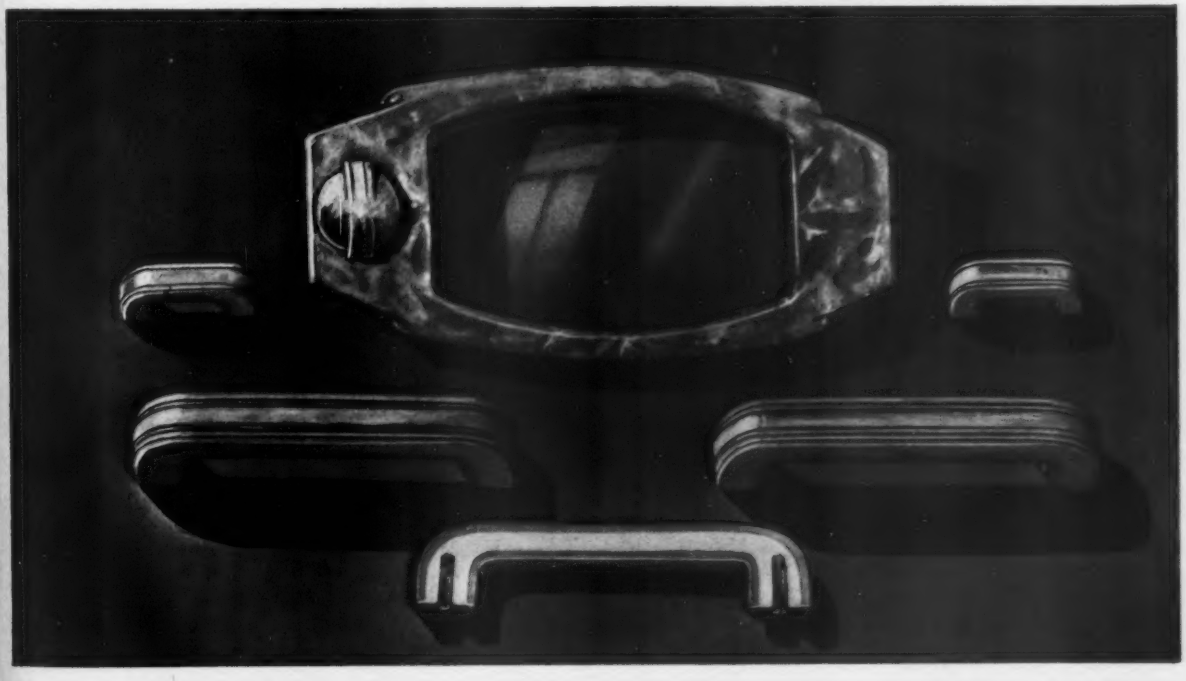

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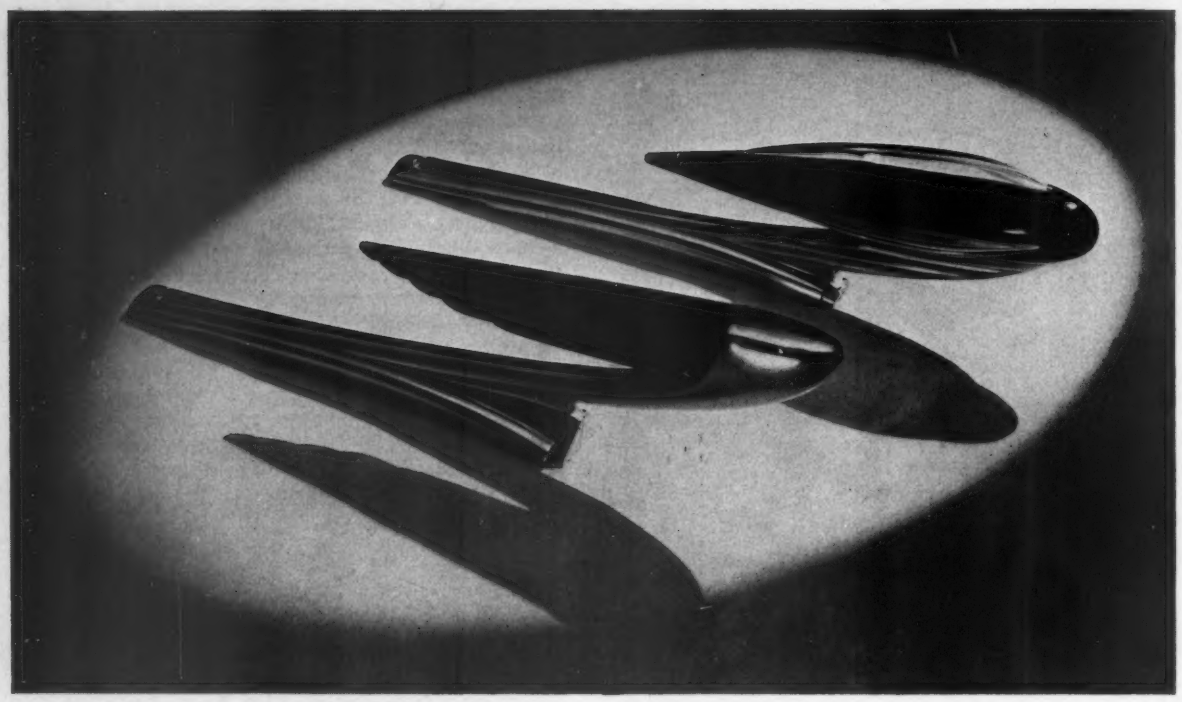

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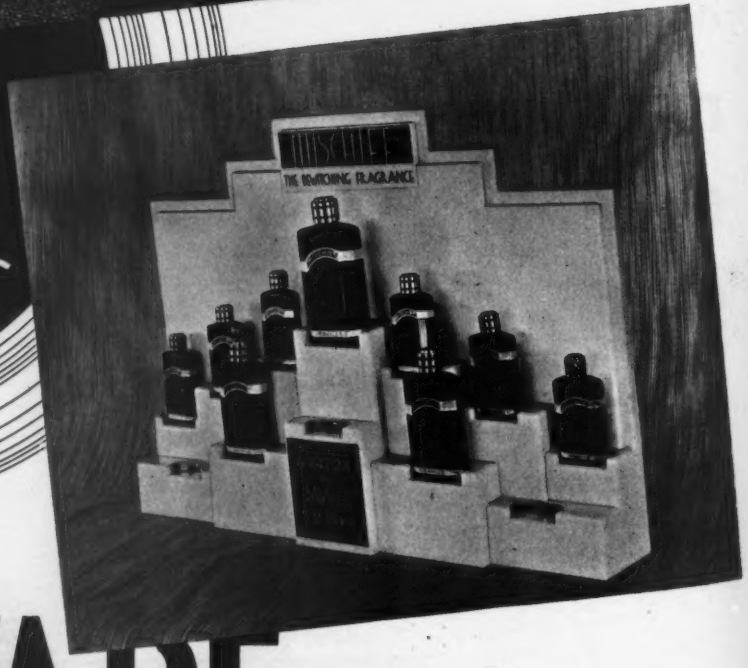

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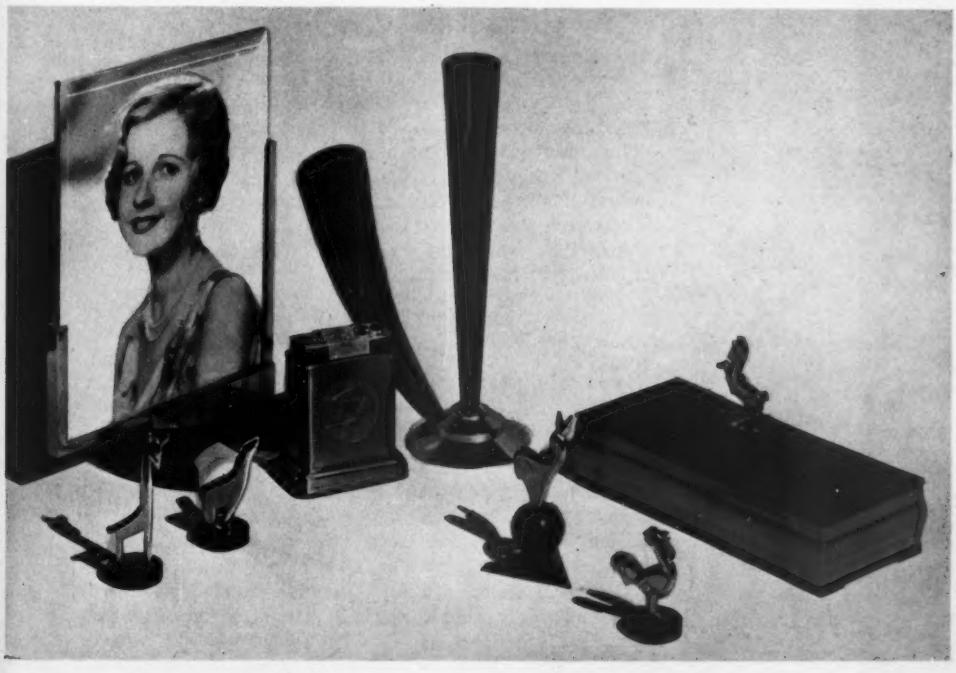

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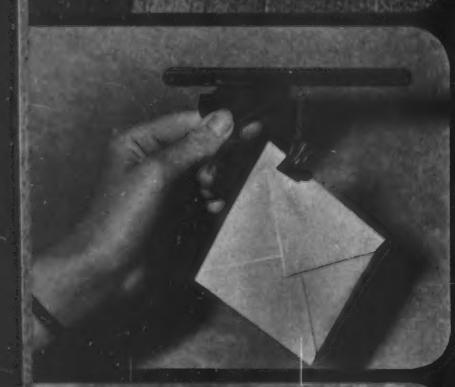

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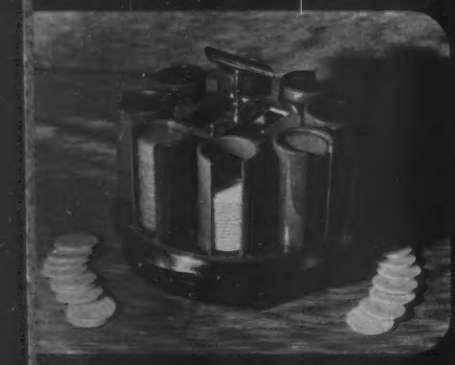

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ZIP fasteners have definitely come to stay, especially as they can be made to look attractive as well as serviceable. The latest plastic zips, in a number of bright colours, many of which are transparent, are already proving best-sellers.

INGENIOUS, but practical, this sums up the moulded cap and applicator device of the new Dupak nail polish. The cap serves two purposes: on the top is a pencil for whitening the nails and underneath is a brush for applying the polish.

THE Chic-Pak Boudoir Stand, "Onslow Court" model, has been specially designed by C. Keith Thomas so as to achieve an ideal of compactness and attractiveness. The stand is moulded of amino resin by Ray Mouldings, Ltd., Ealing, W.5, and distributed to the chemist trade by S. Maw, Son and Sons, Ltd., whilst Messrs. Calmon and Neate, Ltd., are wholesalers for the hairdressing trade.

Symphony in Plastics

PIANISSIMO or fortissimo, it's more than likely that plastic materials play some important part in the formation of those peculiar vibrations we know as music.

By far the largest use for plastics is in the manufacture of piano keys, and for this purpose very considerable amounts of Xylonite are used with a configuration so close to real ivory that it is difficult to distinguish one from the other. The decoration of piano accordions also requires the assistance of plastics, mostly celluloid. Incidentally, a number of cinema organs are now being decorated with coloured Rhodoid. This material is also used for organ stops, mandoline picks and buttons.

The origin of the bagpipe is difficult to discover, but the story cannot easily be discounted that the Irish sent it to Scotland as a joke, but the Scotch have not found it out yet! This is really immaterial, but the fact remains that plastics help to make that weird noise

Another novel use for plastic material. The mounts of the bagpipe may be made of Erinoid, cellulose acetate or Xylonite.

pipers play when they march in with the haggis. Several synthetic materials, such as Erinoid and Xylonite are used for bagpipe mounts.

The latest addition to plastic musical instruments is the transparent piano designed by Cora Scovil, a famous New York artist, and constructed almost entirely of Plastacele. This plastic material is durable and weather resistant and has no effect on the tone of the instrument. Although apparently somewhat flimsy, the glasslike stool constructed of cellulose acetate is sturdy enough to bear the weight of Teddy Brown.

The well-known German thermo-plastic, Mipolam, is now being used for making saxophones and similar instruments, and one of these is on view at the German pavilion at the Paris Exhibition. This synthetic material is transparent and might from the distance be mistaken for glass; it is not, however, brittle or liable to be easily damaged. Although all-plastic musical instruments are only novelties at the present time, there is every reason to expect them to rival those hitherto made of metal, especially as the latter is becoming increasingly expensive.

This piano is made almost entirely of Du Pont's Plastacele, the American cellulose acetate material.

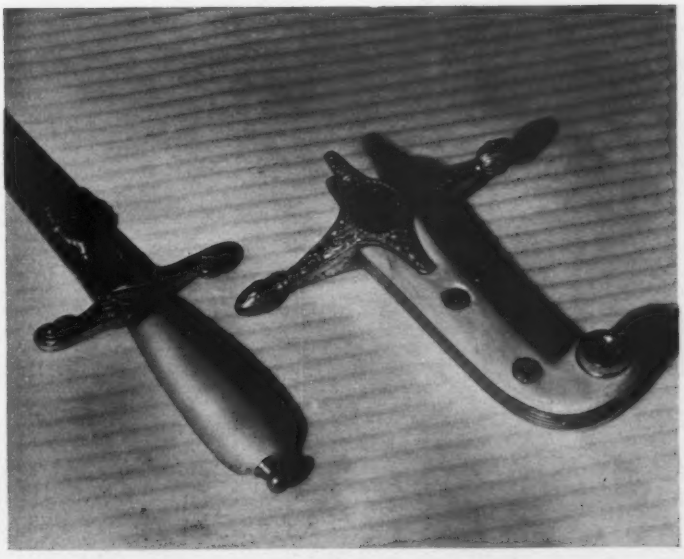
Both celluloid and cellulose acetate are used in a linen-back form for the covering of drums for dance bands. They are chosen for this purpose instead of lacquer because of their extraordinary toughness, and even with the "hottest" music there is little fear of damaging or chipping the surface.

Maybe music does not offer a large outlet for plastics, but the instrument trade appears to give promise of excellent scope to manufacturers not catering for the cut-price market. Why not a complete plastic orchestra.

"Daggers Drawn"

One usually associates swords, daggers and other sanguinary weapons with strong drinks and strong passions, and it is, perhaps, a trifle ironic that a product of milk should now be used for the handles of these weapons.

As Erinoid, the well-known casein plastic, is available in a most realistic imitation of ivory, both the tint and texture being remarkably exact, sword makers are using increasing quantities, both for handles of ceremonial swords and daggers and also for real weapons. The material can be shaped into various forms, both practical and decorative, and lends itself very well to various artistic designs. An important practical consideration which weighs with sword makers is that Erinoid is easier to work than bone. During recent years a considerable quantity of these have been exported to Eastern countries, where there is always a demand for ornamental weapons.



These fine examples of Erinoid sword and dagger handles are made by W. J. Waterer, Esq., Pugh's Place, London, W.1.

"To be really successful, gifts must be useful and must also complement the purchase"

Sales Promotion Ideas

BEHIND every successful sales campaign is a plan born of past mistakes and successes and christened by originality. Manufacturers no longer adopt hit-or-miss tactics; instead, they seek the advice of specialists whose business it is to study markets and evolve schemes for increasing the turnover of existing products and the best methods of launching new lines. One of the most successful methods of giving the sales curve an upward twist is the gift scheme. In its simplest form this consists of giving away some inexpensive but useful article with every one or more purchases.

The type of gift is, naturally, very important. In the first place, it must be something worth having and of use in conjunction with the manufacturer's goods. This linking-up of the gift with the purchase contributes a great deal to the ultimate success of the scheme. Examples of successful gifts are not difficult to find. Manufacturers of a well-known cereal recently gave away a bowl moulded of amino plastic with every large packet of their food, and they found that it increased sales over a third of their normal figures. The bowl was well made, sturdy, and yet attractively designed, and the colour bright enough to appeal to children, for whom it was primarily intended. Mothers of families, particularly working class and lower middle class, appreciated this gift because they realized that, with growing children, breakages are heavy, and a plastic dish gives good service.

Another example of a successful plastic gift scheme is given by the Odol firm, who made a present of a moulded tumbler to every customer who bought a large-size tube of their dentifrice. The temptation offered to the buyer to get something really worth while for nothing usually proves irresistible, especially if supported by appropriate sales talk by the man behind the counter.

The success of the gift scheme naturally depends a great deal on the co-operation of the retailer. He, however, has his own opinion about the entire scheme and it is well worth while listening to it. In an interview with one well-known London chemist, he said: "To be really successful gifts must be useful and they must also complement the purchase. One of the best examples of the gift scheme is the Wardonia razor blade

container which is given away with every 2s. 6d. packet of these well-known blades. Retailers do not favour gifts which cut into their own trade, and, as a general rule, we like to be able to give away something we ourselves do not sell, otherwise it is like cutting our own throats."

These types of sales-promotion schemes, although fairly new in this country, are amongst the most profitable yet conceived by advertising agents and their principals. There are very few lines of goods that are not adaptable to the persuasive powers of this method of high-pressure salesmanship, and it has been tried out very successfully with various kinds of food, pharmaceutical and cosmetic preparations, cigarettes and other types of goods.

If the gift can be moulded of plastic material then the entire scheme is likely to be simplified and less costly than if metal, wood or ceramics were employed. There are several reasons why plastics are suitable for this purpose, and these may, perhaps, be best summarized as follow:—

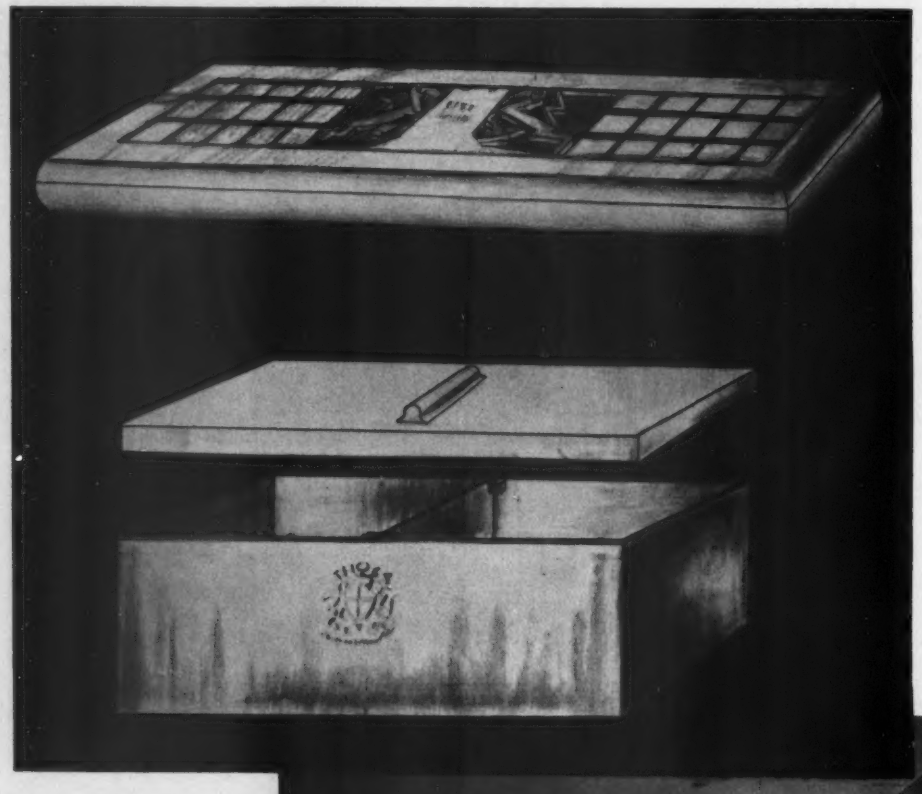
1. Plastic materials are obtainable in an extensive range of beautiful and permanent colours.
2. Mouldings can be produced in very large quantities at short notice and at very economical rates.
3. The material is intrinsically strong and will stand up to plenty of hard wear without suffering in appearance.
4. Mouldings can be obtained in shapes not possible in wood or metal, and for advertising novelties the advantage of specifying plastics is particularly obvious.

There seems to be unlimited scope for plastic gifts, and these need not be confined to counter goods. Large and wealthy insurance companies might be prevailed

Moulded measuring spoons are now given away with every bottle of this well-known American antiseptic.

upon to make a present to every new policy holder of a moulded casket to hold the policy, receipts and bonus certificates. This gift would only cost the company a relatively small amount to have made, but it could be capitalized to bring in a return twenty times the initial cost. The same idea might easily be adapted to meet the requirements of the building societies with their hundreds of thousands of clients.

Any sales manager with initiative backed by sound practical knowledge could break into this new and promising field without any great difficulty. The moulder should train his sales executive not merely to canvass orders, but to put up concrete suggestions, and there are few business heads who would not listen to original and practical schemes specially designed to increase their sales.



Suggestions for gift mouldings include a casket for insurance policies and a box for high-class ladies' footwear which can afterwards be used for brushes and polish.

Parker pen and pencil sets are now packaged in this effective moulded plastic jewel case. The material is Durez and the Gorham Company of America has carried out the moulding.

Say it with Flowers

ALTHOUGH one invariably associates the manufacture of artificial flowers with the wax fruit and antimacassars of staid Victorian days, their origin dates back hundreds of years to the Ancient Egyptians. In the tombs of the Pharaohs have been found strange floral decorations made of painted linen and shavings of stained horn.

These gaily coloured plastic flowers are the type now generally popular for shop display.

Almost every civilization has contributed something to the art of artificial-flower making, and a wide range of materials from Chinese rice paper to the feathers of South American birds has been used from time to time. Since the 18th century the French have excelled in the art and the reputation of Paris manufacturers has always been high. When cellulose-acetate sheeting was made available for artificial flowers, the French were the first to recognize the possibilities of this new material. In this country it is only during the past two or three years that real progress with plastic flowers has been made. To-day the demand is growing rapidly because it is recognized that flowers made of cellulose acetate are more hygienic than those built up of fabric or paper, as well as being dustproof and weatherproof.

Apart from the use of flowers, both realistic and fanciful, particularly the latter, cellulose acetate and "Cellophane" can be used for making fruits and even those queer-shaped cactus plants that are so popular at the present time.

One well-known firm making artificial flowers, Burt Bros., Ltd., of Bow, London, specialize in work for shops, restaurants, seaside resorts like Blackpool, and film studios. Mr. Hiller, principal of this firm, admits that we have yet a good deal to learn from the French manufacturers, who are leaders in this field. It is, however, encouraging to learn that British firms are making excellent headway and turning out some very striking work, which, in addition to being attractive, is strong and able to stand up to plenty of handling.

The general practice of artificial-flower making is first to cut up the Rhodoid or other material so as to form leaves, petals and, if necessary, centres, although these are usually made of beads. This is done either with scissors or by means of stamps which can cut through several thicknesses at the same time. The veins and characteristic markings of the petals are next impressed by means of a die, and curled or twisted to give the desired effect. Finally, the whole flower is assembled on wires around which are wound green "Cellophane."

The method varies slightly with different manufacturers, but the principle is more or less the same. Mr. Hiller, for instance, uses only copper wire for stitching the petals to the centre, so as to make the flowers stronger and more permanent. If cotton is used for this purpose it eventually rots and the flowers fall to pieces.

There is no doubt that the introduction of plastic materials into the artificial-flower trade has acted as a considerable stimulus and the future is quite bright. The most promising outlet for the new weatherproof flowers appears to be their use for outside decoration at fun fairs and amusement centres, especially those elaborate affairs at Blackpool, Southend and Margate.

There is a distinct Japanese air about these dainty and colourful Rhodoid flowers.

Artistically conceived and cleverly made, these artificial flowers, by Burt Bros., Ltd., are excellent examples of the best English work.

Unassembled parts of the new Permastand marketed by Permastic, Ltd.

AGE CANNOT WITHER HER —

Nor custom stale her infinite variety

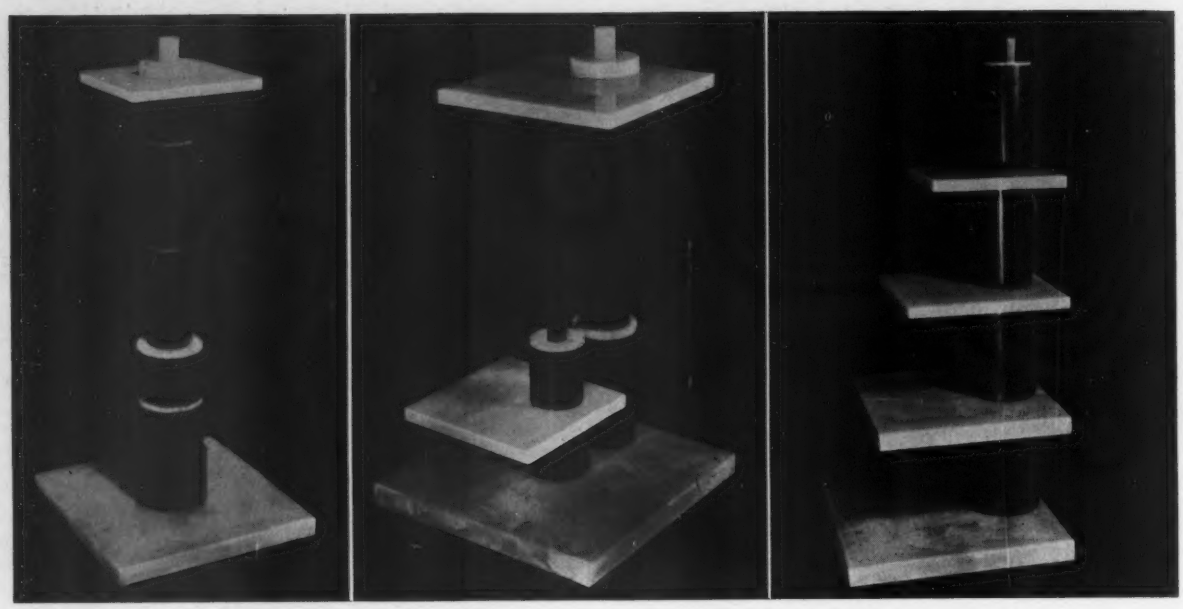
CHANGE, and yet more change! Ideas, and yet more ideas! These are the incessant cries of the window-and-counter-display artists, for novelty and beauty combined make a potent force in modern salesmanship. It is no longer necessary to point out that those who have new ideas and a sense of colour and of beauty of form have reaped the benefit.

The economics of this side of life are interesting, for to change display stands about three or four times a year and to distribute some thousands to agents, as a good many perfumers and other large manufacturers do, must be done with more than half an eye on the cost. Even for the single shop, large or small, continual change of display devices is essential, but it must be done at a reasonable cost.

It is, therefore, with an almost unbecoming shout of pleasure that we welcome a completely new method of display, at once peculiarly plastic in character and, as far as we can see, everlasting; it is everlasting not merely with regard to the physical life of the material, but, what is perhaps more important, everlasting in the variety of form of display which can be obtained.

Call it a jig-saw puzzle if you wish. But it is not that, for a jig-saw puzzle can only produce one finished shape and, besides, this is no puzzle but an exquisitely simple means of producing new forms. It even goes beyond the child's "Meccano" set, for, given a number of units, hundreds of different designs and shapes can be built up by one's own ingenuity and taste.

Here it is, then: the new Permastand, composed of



Three simple arrangements of this new display accessory.

42 units in the complete set, in solid Permaplastic, the beautiful cast resin made by Permastic, Ltd., of colourful translucent beauty and withal capable of withstanding most acids, alcohol and other chemicals and easily cleaned, if stained by dirt, by means of a duster.

Each set is composed of baseplate, tubes and circular discs in different colours, the whole structure being firmly held to the base by a brass rod fitting into the latter. On this rod is built the combination required. At first encounter it will be thought that, although some change between two structures is obviously possible, the change will not be great. Nothing could be a greater error. The change is really remarkable, especially since the juxtaposition of colours can also be altered.

We have amused ourselves in this office by rearranging the set in a few different ways to show various effects. The accompanying photographs are the results. The real difference is still greater owing to colour rearrangements. How many different forms can be obtained would be the job of a mathematician, but the possible combinations must run into thousands, for it is not merely a question of rearranging 40 pieces, but also additional forms derived by placing plates, etc., at different angles to the vertical.

Permastic, Ltd., desire us to point out that normally they manufacture the raw material for the trade; that is, in rod, tube or other cast form, which manufacturers shape to their own ends. The Permastand, being a unit, is an exception and will be sold direct to inquirers.

Plastics Lectures at Borough Polytechnic

A course of nine lectures on plastics and their applications in engineering is being given by Mr. G. R. Eyssen at the Borough Polytechnic, Borough Road, London, S.E.1, on Friday evenings from 7.30-9 p.m. The course began on Friday, October 22, and deals with:—

The possibilities of plastics in the design of non-metallic bearings, heavy-duty mouldings of high-impact strength, large switch gears, aircraft design, non-corrosive acid and alkali-proof materials, flexible tubings, etc.

Moulding compounds of phenol-formaldehyde and urea-formaldehyde type and moulded and laminated materials made from them.

Synthetic-resin bonded bearing materials.

Electrical insulating materials and accessories made from thermo-hardening moulded and laminated materials.

Synthetic rubber and rubber-like plastics; thermo plastics, e.g., poly styrene, vinyl chlorides, acrylic esters; cellulose esters; casein mouldings; asphalts, their mixtures, etc.—their applications in industry.

Demonstrations of products made from the materials described. Possibilities of improvement of design by use of plastics, etc. The fee for the course is 10s.

Rubber Technology Conference.

The Institution of the Rubber Industry has issued the preliminary programme of the Rubber Conference which is to be held in London from May 23 to 25, 1938, inclusive. Instructions for the preparation of papers accompany the programme, and it is notified that papers should reach the Secretary, Institution of the Rubber Industry, 12, Whitehall, London, S.W.1, by March 31, 1938.

B.B. Tool Co., Ltd.

We are glad to have the information that this company were the designers and executants of the moulds used for making the Chic-pak powder box and cotton-wool holder described on page 138 of our September issue. We should also point out that, owing to an oversight, it was stated that the hole in the holder is punched out; it is made in the moulding process.

PLASTICS and DESIGN

With Special Reference to Some Radio Cabinets

by ERIC PALMER

ON page 12 of the Council for Art and Industries report, called "Design and the Designer in Industry," there appears the following paragraph :—

> "The shortage of original, creative design in some of our industries at the present moment can be illustrated by reference to certain industries which have recently been created. One or two of these industries are now developing a series of new materials easy to work and readily adaptable to a number of purposes. These materials, while possessing definite characteristics of their own, form effective substitutes for many older and more difficult materials. Almost anything can be done with them, but the new industries have not yet fully explored their inherent possibilities and limitations, and are producing but little fresh design, related to the properties of the material itself. Instead their designers often tend to use surface ornamentation to cover defects in workmanship, and aim merely at copying other objects in shape and colour and at imitating the characteristics of other materials and processes—tortoiseshell, ivory, glass, wood, marble and even marbling and graining—although the essential properties of the material make it possible to secure by natural use effects richer in colour and finer in form than those based on imitative processes. No real progress will be made on these lines."

The above report, published this year, can be obtained from His Majesty's Stationery Office, price 1s.

Survey

Before plunging into the question of design and its particular relation to plastics, it would be as well to review the position of present design as found in other departments of life with which we are in more intimate contact.

As architecture is at root the mother of all design, we will consider cursorily to what extent it has influenced our thoughts on design over the past few years.

Some 20 or 30 years ago saw the beginnings of a new thought in architecture. What originated this is difficult to define. The urge to break away from the overloaded and fussy Victorian style; an unconscious desire to clean the mind of the associations of war; the acceptance of the machine and all it implies—undoubtedly all these were strong contributing factors, but the whole story of the growth of this new style has yet to be told. It is significant, however, that this new thought produced a style which is now commonly known as "modern architecture."

For the purposes of this article I am not going to amplify on this definition, as everyone is familiar with its implications.

Now, the principle of this style is in essence simplification. Muddled thinking is absent. Simple truths are expressed in the most efficient way possible. For example, on final analysis, a house is simply a large box, consisting of four walls with holes to admit air and light, a door for entry, a covering to keep out rain, and an arrangement to provide heat for warmth and cooking purposes. And I suspect you will be thinking that some modern houses certainly fit this description. Well, I hope you do. You will at least be mindful of true form. Obviously, such a house does not constitute a habitable home. But it has all the elements of simple truth. In fact, modern houses are "first" designs made possible with modern building technique and the application of new materials.

Design for Transport

Another sphere of design to which reference must be made is that of the modern aeroplane and motorcar. Here again we have the results of the expression of simple truths backed by scientific research. These two means of transport are both the product of the machine designed for it and produced by it. No attempt is made to disguise the fact that they are designed to travel at speed through the air. Everyone accepts their design, and some folk go so far as to appreciate their abstract form, and to admit that they have a beauty of their own. Compared with their type of 15 years ago, one marvels at the progress made. And yet at one time machines were purposely disguised, and concealed with masses of ornament. On view in the Science Museum is an actual rolling machine built in 1750, which, because of the applied ornament of classic design, is unrecognizable as such.

Before turning to our subject proper there is one other aspect of design which must be mentioned, and that is furniture. Here again we see the acceptance of the machine as applied to wood working. The whole outlook of furniture design has changed almost whilst we looked. Admitted, all we see is not good. A fashion soon became a cult, and what was good as a type-form has become debased with commercialism to the detriment of good design. Nevertheless, as a whole, furniture design to-day, although modernized, is based on a good tradition which extends back for centuries.

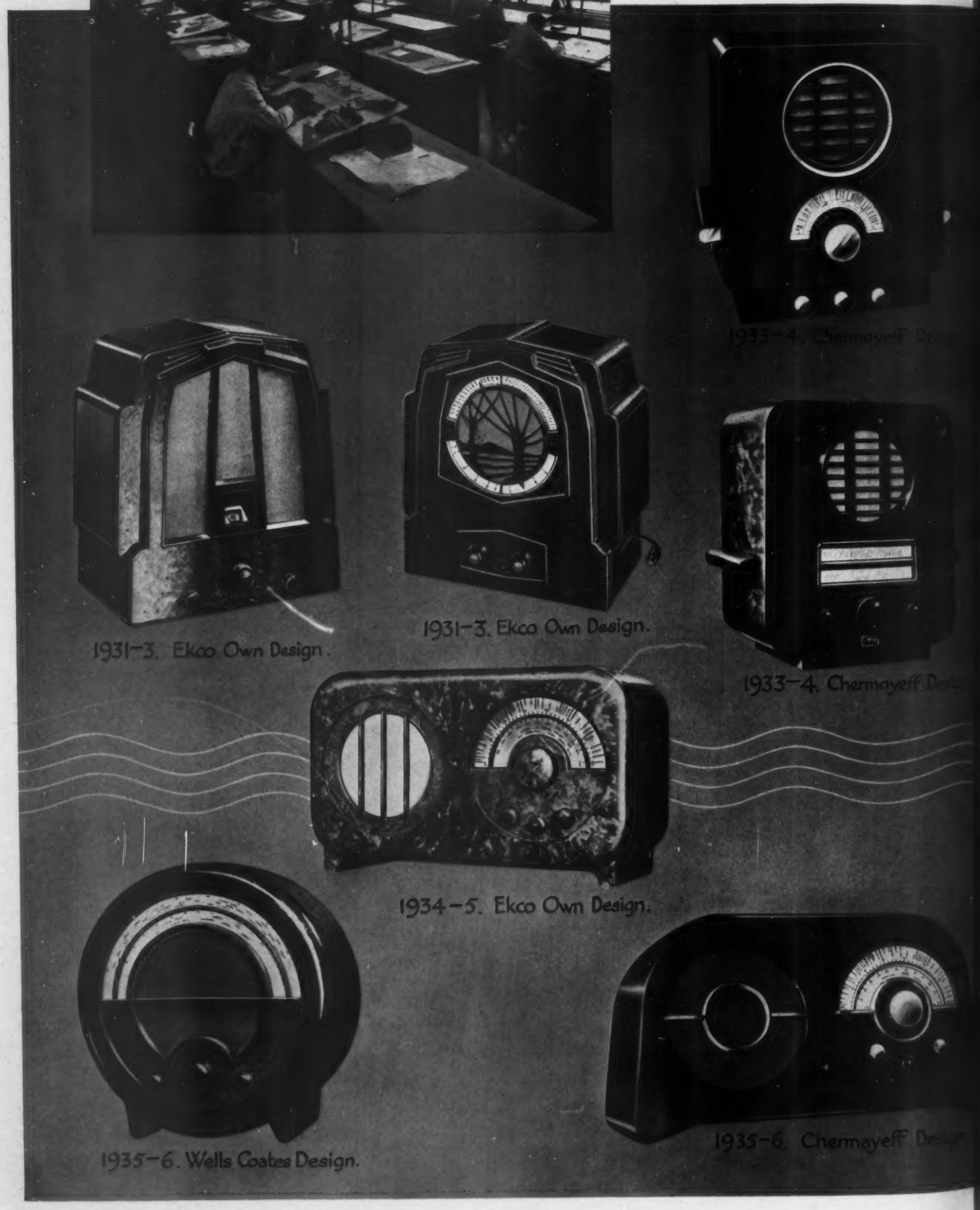
Conclusion

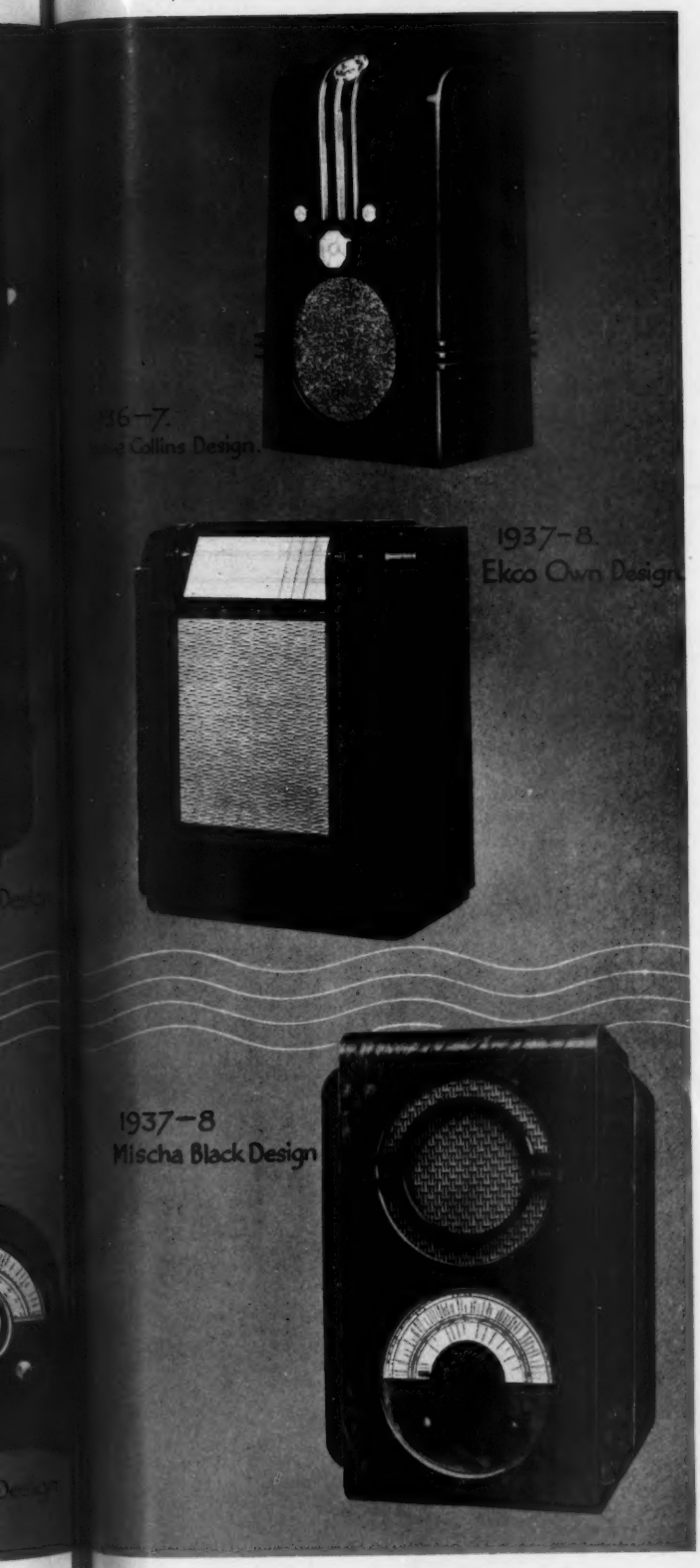
It will be recognized that all through this survey one central idea stands out above all others. That idea is the all-pervading power of the machine. All the various aspects of design reviewed clearly indicate its influence. All have accepted it, and all designs are made subject to that acceptance.

Design and Plastics

First, it must be recognized that plastics, except, of course, bitumen, which has not been used for artistic purposes, have no tradition on which to build. It is, in fact, here new born, to mould and form for use by all manner of trades and business concerns as well as

A range of radio cabinets that have been produced by Ekco from 1931 to the present day. It forms a striking example of the evolution of modern plastics design.





the huge domestic field. And because of its lack of tradition it behoves all concerned with its furtherance to look back and study all spheres of design where the machine is the producer. There is plenty to learn. We can trace the halting steps, see the caution, and admire the thought and courage through which the problems of others have been surmounted. The plastic traditions of to-morrow are being made to-day. We must see that we build well.

Perhaps the nearest approach we can make to a similar material as plastics is through a study of ceramics. In this we have a mouldable substance centuries old, offering examples of design and methods of manufacture from the earliest days to the present time.

It may be of interest to recall the fact that Wedgwood was among the first to accept the machine as an adjunct to manufacturing his pottery, and that the type-forms evolved by him have not been surpassed.

Glassware again offers yet another avenue of approach. Here we have a mouldable substance with a tradition, now accepting the challenge and producing articles of good design—based on its tradition—yet quite acceptable to modern thought. In manufacturing technique our own injection system closely resembles the moulded products of glass.

In these similarly plastic materials there is infinite scope for study and analysis, not, I must insist, that their forms should be slavishly copied, but rather that from their forms new shapes to suit the demands of plastics proper should be evolved. Up to the present it is all too evident that practically no thought has been given to this question of analysis. Many bright industrialists have seen plastics as a new material for exploitation, and have seized the opportunity of supplying in plastic material many forms already existing in other mediums. How many moulded clock cases are there on the market which are not almost exact replicas of their wooden prototypes? The joke is that most modern clock movements do not require such a housing, for the majority are already housed in a dust-tight metal cover integral with the ideal! And those few which must have a housing—is there no one designing in plastics who can produce a form other than the familiar type?

Electric switch covers. What a harvest someone reaped here. It seems from inspection that the majority of manufacturers ran out of the old brass spun cover on precisely the same day, and swamped moulders with orders for plastic covers. The porcelain base, however, still holds its place with many. Switch dollies soon followed the plastic trail. But how many are there which match perfectly the colour of their brother, the cover? Can we hope for a little thought here? And can we hope for less copying of the brassy cover? Would it be true to say that the ordinary 5-amp. domestic switch is perfect?

Progressed Design

To date the wireless industry provides the best examples of plastic design. Quite early the possibilities of plastics were visualized. Its well-known insulating properties at once made it of value, and its continued use has made it a standard material throughout the trade.

In 1930 E. K. Cole, Ltd., the well-known manufacturers of radio receivers, made plastic history by producing in Bakelite a completely moulded cabinet. The accompanying illustrations afford, in little, an

excellent review of progressed design, showing the caution and, later, some boldness, and then again more caution as ideas have been evolved.

The cabinets of 1930 are quite simple affairs. Like our analysis of the house, so with these cabinets. Simply two boxes. One for the set and one for the speaker. The influence of the cabinet maker is apparent in the beading around the edges, and the influence of pressed metal technique is also seen in the central escutcheon. For the first time, too, colour was introduced—one assembly being obtainable in dark jade.

The following season saw another brave attempt, and the form maintained for two years. This, designed by Ekco's own design department, combines set and speaker in one unit. Here the design is quite definitely under the influence of pressed metal technique. The successive steps at the top give one the distinct impression of a pressing, and that impression is strengthened by the outstanding front and sides. No attempt was made to introduce colour. The cabinet is constructed of Bakelite, again in a warm walnut shade!

For the models of 1933-4 Ekco's decided to seek a fresh design from outside. The well-known architect and industrial designer, Serge Chermayeff, was commissioned to produce a design, and the result is as shown by model 64. A second attempt produced model 74, and in all respects it is superior in balance and form.

The influence of the wood cabinet is still there, simplified, but a distinct plastic feeling is in evidence. Although produced as standard "in walnut finish," this cabinet was also obtainable in black with chromium fittings. As this set was a huge success, Ekco's again went outside for their 1934-5 cabinet design. Another architect and industrial designer—Wells Coates—was invited to submit ideas, and the two models shown were his contribution. The circular design was, indeed, a bold step, but shows a complete grasp of "plastic" feeling. It shows, too, the functional, analytical mind in the fact that the circular movement of the turning knob and scale pointer and speaker cone are stressed, and made apparent in the general form of the cabinet.

The season 1935-6 saw three models produced. One model by Ekco's themselves, and two models by Wells Coates and Chermayeff respectively. There is little progress here. Some improvement in style, such as shown by the black cabinet and ivory knobs, and a certain refinement in form. Chermayeff improves on a previous model and obtains a sympathetic linkage of emphasis by the use of line and texture of surface.

With the production of a new tuning system Ekco's turned to another source for a cabinet design. In 1936-37 a model designed by Jesse Collins, of Industrial Designs Partnership, shows again a new and fresh approach to the plastic cabinet. Plain, straightforward and unmannered except for the banding at the sides, this model shows the result of clear thinking and an appreciation of plastic form. Again in overall dimensions this set is large, but the cabinet has achieved a slender grace by the accentuation of height in the setback of the two sides.

For 1937-38 three models again—one designed by F. C. Ashford, one by Mischa Black, of Industrial Designs Partnership, and one by Ekco Designs Department. Three new conceptions, three brilliant designs. Mischa Black's design is somewhat similar to previous models, but the form certainly suits the material, and the skilful use of line emphasis gives a thoroughly harmonious design.

The Ekco design is a real step forward and is undoubtedly a design of high merit. Severely efficient, it is in all respects a worthy successor to those designs which have gone before. Although the steps on each side of the tuning wheels appear to hamper ease of tuning, the so-called "spin wheel tuning" has been exploited, with excellent effect in achieving a clean, swept front without being fussy or in any way mannered.

Italian Government Aid for Synthetic Rubber Industry.

Recent decrees of the Italian Government provide for assistance to synthetic rubber manufacturers in the form of reduced duties on machinery and raw materials, lower taxes and production subsidies.

Synthetic Rubber Production in U.S.A.

According to a Washington report, the monthly output of synthetic rubber now amounts to about 100 tons a month. Neoprene, Thiokol and Koroseal account for most of this output.

New Rubber Factory for Rumania.

The Rumanian Government has granted several privileges to the new company which will be operated by the firm of Banloc. These include an embargo on the importation of machinery for the manufacture of rubber products by other parties until November, 1938.

New Cellulose Coating.

This has been developed by the Detroit Macoid Corporation, of Detroit, Michigan, for application by dipping or spraying on to rubber, metal, wood and glass surfaces. The materials to be coated do not require special preparation or surface treatment because the coating is flexible and has the property of adhering tenaciously about the surface to which it has been applied.

New American Thermo-plastic.

The Neville Company, Pittsburgh, Pa., are now producing a new dark thermo-plastic resin known as Nuba. It is brown to black in colour and is practically soluble in aromatic solvents. Its outstanding properties are toughness and elasticity. It softens upon being heated and may be blended with several other thermo-plastics.

Italian Demand for Danish Casein.

The Snia Viscosa Company of Milan has placed a large contract for casein with the Danish Milk Condensing Works at Nakskov. It is to be used for lanital fibre production.

Shawinigan Resins Corp.

Owned equally by the Fiberloid Corp. and Shawinigan Chemicals, Ltd., Shawinigan Resins Corp. is making rapid progress in the erection of a plant at Springfield, Mass., where vinyl resins will be made.

Ideas—

By the EDITOR

Hats and Hair

A reader from Exeter, who signs himself "Cellulax" has sent along two ideas which, for originality, deserve commendation. His first is the production of men's hats, shaped in light canvas and dipped in cellulose compound to retain their shape. He suggests that a lightweight and showerproof hat such as this would find a ready market in place of the hard and heavy "straw" and the "panama," which is so easily spoiled by rain. This is an excellent idea, although I doubt whether "cellulose" solutions would give a sufficiently waterproof film. But this problem is not insuperable, and the Bakelite or Amino types of lacquer should prove useful.

His second idea is the production of artificial hair, of which so much is imported from the Near East. I do not think that, apart from artificial silk, any filaments from synthetic materials are made. The questions that jump to the mind are: What is the strength required, and will synthetic filaments curl permanently? Certainly any colour will be easily obtainable.

Clock-face Numbers by Injection

One of the most ingenious of ideas that has come my way is a novel method of clock-face making. It avoids the old method of fixing the figures on the face by hand, and furthermore in such a manner that they cannot fall off or be removed other than by considerable force. The circular dial is of laminated sheet, with number-holes punched in it. It is then placed in the die of an injection moulding press, and a thermoplastic is then "squirted" in from the back. The photograph on the right is the reverse of the dial, and shows how the plastic flows into the 12 holes. The injection method, of course, gives very rapid production. The reader who sent this example informs me that he has patented this novel application. I should not be surprised to see this process applied for other purposes.

Luminous Plastics

The editorial on this subject published last month created no little interest among many of our readers, and also brought several inquiries and new suggestions. One reader tells me that along the whole length of the famous Maginot line, the defence trenches on the eastern frontier of France, luminous plastics are being employed for direction indicators, such as "This way to the dug-out."

Another illuminating suggestion is to use luminous transparent or translucent sheet to manufacture lampshades, so that if the light goes off one can continue reading! Certainly the position of the lamps would be visible on entering a dark room.

I wonder if there is an idea here for the cinema—for obtaining "queer" effects in films of the type Boris Karloff appears to prefer.

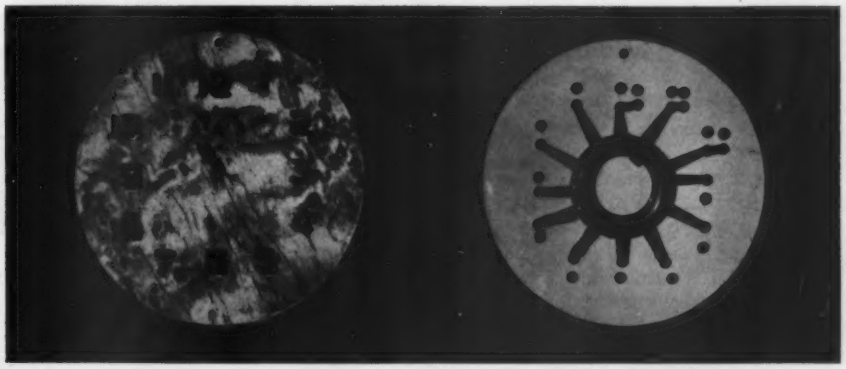
Non-inflammable Dolls

I was glad to receive a letter in reference to my remarks last month, from the British Xylonite Co., Ltd., informing me that dolls made from cellulose acetate are not the prerogative of French manufacturers, but are now being made in this country. I am including the letter here, as the reasons for such production are stimulating.

"I am sending you a sample of a 'Bexoid' doll made in our factory at Hale End. Some thousands of these dolls have been sold in different sizes, the sample sent you representing the medium size. The history attached to the production of this doll is very interesting.

"Three years ago at the British Industries Fair, Her Majesty Queen Mary and the Duchess of York (now our present Queen) expressed a wish for a doll that would not burn easily.

"Our own chemists got to work with the manufacturers of the actual acetate material, and this particular doll that you now see is the result of chemical and mechanical engineering skill. Further, not only has it



Obverse and reverse of injection-moulded clock-face.

been commented upon in highly favourable terms by Arthur Mee, the editor of the *Children's Magazine*, but it also formed part of a Gaumont news reel a few months ago, with the writer demonstrating the safety of the doll with a lighted candle. Further still, the doll is absolutely British throughout, material being made at our Brantham works, near Manningtree, Essex, and the moulds and dolls being manufactured at Hale End. The finished dolls, however, are marketed by our subsidiary company Cascelloid, Ltd., Britannia Works, Abbey Lane, Leicester.

"It took our chemists 12 months to produce a satisfactory material to stand up to the blowing, and the first dolls produced from this material were purchased by Her Majesty Queen Mary and the Duchess of York at the next British Industries Fair. At the subsequent British Industries Fair the dolls were then marketed for the first time, when further purchases were made by Her Majesty Queen Mary and the Duchess of York on our stands at the fair."

Yours faithfully,
The British Xylonite Co., Ltd.
H. GREENSTOCK, Sales Manager
(Mouldings and Specials Sales).

Anti-Foam Device

A reader sends us a curious-looking flat disc of enamelled metal, which he says is very widely used in France to prevent milk boiling over. The disc is placed at the bottom of the pan. He is at a loss to explain how it acts, but it does act efficiently. He asks whether or no it could be made of some plastic material, as the usual substances, glass and enamelled

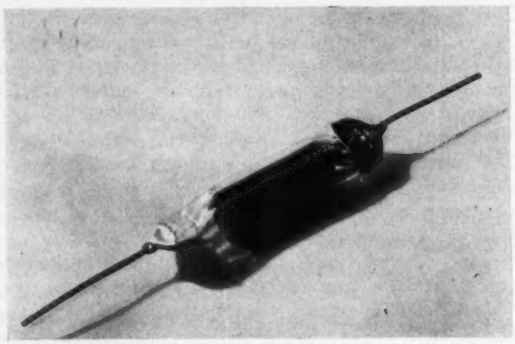
iron, break easily in the former case and chip and rust in the latter. It can, of course, be made of plastics, as it is quite a simple moulding, but I fear there is no material that would prove better than glass or metal for this purpose; continual boiling in water or milk over long periods would eventually disintegrate a plastic disc. Sorry! However, the disc does do the job.

Protecting Towser

We have given a reasonable amount of publicity to transparent plastics used as a material for packaging in a "See what you buy" campaign, and also as material for producing hats, dresses and so on. Judge my pleasure when, strolling out the other day, I saw a dog clothed in a gent's very natty autumn suiting made of "Cellophane," or cellulose acetate, trimmed with an edging of red silk. Very chic and probably kept the rain off, if not the cold. My Scottie, who was with me at the time, looked at me, curled his lip and hissed, "Cissie"!

A Transparent Plastic Condenser

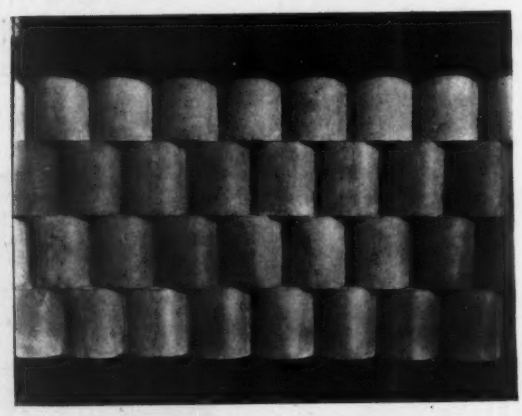
I have received an interesting device which, for simplicity of manufacture and obtaining special characteristics, deserves some commendation. It is a small electrical condenser, such as can be employed for radios in which the usual moulded container is replaced by a transparent tube. It has been constructed out of extruded tubing from a thermoplastic material (actually Mipolam was used), and the



ends firmly welded together by heat and pressure in an extremely rapid and simple manner. Since the tubing is perfectly air and water-tight, and is not moisture absorbent, the condenser fulfils its purpose admirably. The texture of the tubing is rather like rubber.

Tiled Dadoes

Owing to pressure of space in our last issue we were unable to include an interesting application of decorative tiles, which were shown as an example of mural treatment in the Pavillon des Matières Plastiques at the Paris Exposition. A large section of wall was treated in a variety of ways, one of the most striking being that shown in the accompanying photograph. The units shown are moulded plastic tiles



curved in shape and of a delicate pastel grey tint. Each layer is cemented firmly to that above it. Perhaps there is nothing special about the tiles, but the method of arrangement was extremely attractive.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

The Function of Art in Industry

LAST month we attended the inaugural meeting of the Plastics Group of the Society of Industrial Artists. What struck us forcibly was the confession of more or less complete ignorance of plastics by many of the speakers. On second thoughts this is not surprising, nor is it particularly criminal. Indeed, in the final count, such ignorance may prove helpful in their approach to plastics.

What concerns us, however (and we ask this with a good deal of sympathy for the new group and the already existing National Register of Industrial Art Designers), is how the plastics industry is to be led along the path of right-doing—the path that will lead to more beautiful and more saleable products. At the above-mentioned meeting, expression was given to the necessity of collaboration with the moulding industry. Good! But what, in detail, does this collaboration mean? Is it to be merely collaboration over a board-room table with a few preliminary airy sketches passing between director and artist, or will the latter make a real attempt at discovering what the raw materials of the industry are like, how they are fashioned and what problems are involved?

We should certainly be loth to entrust the design of a pepper-pot to an eminent R.A., or to the finest designer of beer or 'baccy advertisements, if he had never seen a moulding powder. This criticism is not, we think, unduly harsh. Those artists who have considerable experience of plastics know it to be reasonable.

Mr. Kenneth Chance, in his recent paper on "The Function of Art in Industry" before the Institute of Plastics, was extremely bitter in his attacks on the "self-appointed" critics of art in the plastics industry and of those artists who, though given the chance, were unable to raise the existing standard because of their ignorance of the industry.

A first-class business man and head of one of the largest mould-making and plastic moulding organizations in the country, Mr. Chance is very clear in his own mind what constitutes art in industry. "Surely the first function of industry," he says, "is to give the public what it wants at a price it can afford to pay, and the function of art in that connection is so to design the article which is to be made as to make it attractive both in appearance and in its suitability for the purpose for which it was designed. In other words, its design should be simple and effective, the article should be desirable to buy and should be available at a price consistent with its value. I have seen the suggestion made more than once that, in educating the taste of the public in design, the question of price should be ignored. But if the price of the article exceeds what the public considers it to be worth, it will not be purchased; if no one buys it, it will not be seen, and if it is not seen it can have no educative value. Such a suggestion is typical of much of the destructive criticism which is freely offered to this industry."

Mr. Chance then related the abortive efforts in the early days by artists of little practical knowledge of plastics to produce a saleable commodity. Finally, the only successful results were obtained by the introduction of an artist into the factory and by soaking him "in the knowledge and craftsmanship of plastic moulding in all its branches until he knows intimately its possibilities and its limitations." In other words, the artist, says Mr. Chance, must take his place in the scheme of things alongside directors, salesmen, engineers, estimators, works manager, and even the girl who packs the finished article.

Mr. Chance, therefore, considers he has the right to demand of the artist who would design for plastics: "What are your qualifications? What study have you made of the intricacies of the plastic moulding? Where have you learnt to design a plastic mould? What knowledge and experience have you of the raw materials of the industry?"

These are fundamental questions with which we in the industry cannot but agree.

As to the question of price being so all-important, many readers will disagree, for there are abundant examples of high-class mouldings which find a very ready market—not so large as that of the low-priced goods, but one that brings a good profit and satisfaction to the maker. To take one example only: there are door handles at 6d. to 1s., while others are being sold at 3s. 6d. each. Some manufacturers obviously believe that finely made articles can be sold.

There is still the question of the outside bodies of artists such as the General Register of Industrial Art Designers, the Plastics Group of the Society of Industrial Artists, and what we should be glad to see—an artistic design section of the Institute of Plastics.

The first two groups appear eager to collaborate with the plastics industry, and if a sympathetic understanding of the needs of both artist and industry is arrived at

we shall benefit in spite of past mishaps. Criticism is healthy and necessary.

Moreover, we cannot help but think that there will be ample room for the consultant artist with the requisite knowledge, and that in the smaller factory the artist will tend to become a hack for every little job that is going and be restricted from utilizing his initiative. After all, the artist is an artist and not a technician.

At the end of the meeting it was announced that Mr. Chance, on behalf of his company, British Industrial Plastics, Ltd., has offered to the Institute a post-graduate scholarship, i.e., a pupil who has received a training in the industry will be able to complete it in an art school.

Soya Bean Plastics

WE have been inundated with inquiries during the past few months for information regarding plastics made from the soya bean. It is all a result, we presume, of the extraordinary publicity given to this material, some of the more sensational dailies inferring that the plant bearing the beans will save us from starvation or, at least, night starvation, is much more nutritious than fillet steak, and our future motorcars and aeroplanes will be built from the plastics made from it. Also, that even now Mr. Ford is using it very extensively in building motor bodies and motor parts. One farmer in this country is actively engaged in testing out its suitability for growth here.

We do not know much about it: and we fear that what we do know is not very sensational. Practically all the soya bean imported comes from Manchuria. It is used to make a marvellous sauce, and, because of its high protein content, is an excellent raw material for making special foods. Whether it possesses the dozen or two vitamins that seem to be present in everything we do not eat, we are unable to say.

With regard to plastics, we must be more cautious. It is apparently a fact that Henry Ford is using soya-bean meal for certain purposes, but, so far as we know, it is only in small quantities and only in conjunction with a phenol-formaldehyde moulding resin. In other words, according to our information, he is not using a pure soya-bean plastic. There is probably an interaction between the soya and the phenol and formaldehyde, but the result is at most a modified phenol plastic.

It is highly probable, however, that soya bean may become important in itself either using the meal or the more or less pure protein made from it. Promising plastics have been produced, but so far they are only "promising." Authoritative chemists refuse to commit themselves to a more definite expression.

Most of the important work is being carried out in America. The main line of attack is to produce a new and different type of protein plastic—one that is not plasticized with water and with which it may be possible to produce a true moulding powder. Another phase of this work is to produce textile films.

Moulders Install New Plant for Motor Orders

Considerable advances in the moulding of plastics for the motor industry are predicted from reports recently received from moulders, who, in some cases, have installed extra plant to cope with orders from car manufacturers. The advantages of the use of plastics instead of metal and wood are now being appreciated by the designers of modern cars, who find that their use enables considerable reduction in the weight of the car, and this, of course, means more miles per hour for less fuel consumption. The finish of a moulded frame, panel or fitting to a car is far better in plastics than in wood or metal, and does not get knocked about or scratched so easily. Then, again, the insulating properties of Bakelite and similar synthetic resins all tend to reduce noise and improve comfort.

As an example of the work now done by moulders, it may be mentioned that H. E. Ashdown (Birmingham), Ltd., are now turning out window and door frames, windscreen strips, dashboard dials, glove compartments, instrument panels and roof lights for many of the best-known English cars. The firms supplied with mouldings by H. E. Ashdown (Birmingham), Ltd., include the Standard Motor Co., Hillman Motor Car Co., Ltd., Humber, Ltd., Clement-Talbot, Ltd., Morris Motors, Ltd., and the Ford Motor Co.

So Now You Know

A Midland daily regales us with the following historical tit-bit:—

"Sixty years ago, in the workshop of a Bradford chemist, an accident occurred with results that have already created a new and thriving industry.

"What happened in that chemist's shop was not in itself very startling. A cat upset some acid over a piece of cheese hanging in a mouse-trap. When the chemist went to the trap next morning he found the cheese had been changed to a solid substance something like celluloid.

"That was the beginning of synthetic resins and the making of plastic mouldings."

Of course, modern science has progressed since those days, and the latest patents no longer insist that cats, cheese and traps be employed.

Society Meetings

November 11.—Midland Section. Institute of Plastics. Armistice Day Dance at Grand Hotel, Birmingham.

November 12.—Society of Chemical Industry, Plastics Group, Edinburgh Section, at 7.30 p.m., North British Station Hotel. Dr. Baxter and Mr. Moore, "The Properties of Chlorinated Rubber."

November 26.—Society of Chemical Industry, Plastics Group, Birmingham Chamber of Commerce, 8 p.m. Mr. F. Sproxton, "The Rise of the Plastics Industry."

November 30.—Institute of Plastics, Midland Section. James Watt Memorial Institute, 8 p.m. E. Marsden, "Plastics in Telephone Engineering."

December 1.—Institute of Plastics, London Section. British Industries House, Marble Arch, 7.30 p.m. Mr. N. H. Buckley, "Trade Marks."

December 7.—Institute of Plastics and Plastics Group (S.C.I.). Burlington House, Piccadilly, 7.30 p.m. Dr. R. W. Aldis, "Some Possibilities of Shellac as a Moulding Plastic."

Plastics in Engineering

On October 14 Mr. M. D. Curwen, Editor of *Plastics*, gave a lecture on "Plastics in Engineering" before the Engineering Society, City and Guilds College, South Kensington.

PLASTICS AND THE ENGINEER

At the recent general discussion on lubrication and lubricants, at the Institution of Mechanical Engineers, two papers with reference to plastics were presented.

In his "Bearing Materials Bonded with Synthetic Resin," Mr. G. R. Eyssen dealt with the three groups of material that are being employed: (1) bearings made from plain or graphitic moulding powders; (2) those made from laminated products, and (3) mouldable bearing materials based on felts of impregnated non-orientated fibres. The first group, from which small bushes are made and which are run dry or are lubricated with almost any liquid, is sometimes replaced by those of group 3.

The laminated bearings made from textile fabrics or paper are most important. These operate very efficiently with water alone for lubrication and cooling. The elimination of oil and grease is a big advantage, while the wear of shafts and roller necks is considerably reduced. The wear of the bearings themselves is negligible compared with bronze bearings. Since, also, laminated bearings are very resistant to shock, they are superior to the metal type for heavy-duty purposes.

The following table shows the average coefficients of friction for the laminated type of bearing and that made of brass:—

Lubricant.	Brass.	Laminated (Cotton Base).
Dry	—	0.25-0.42
Grease	0.10	0.14-0.12
Oil	0.06	0.07
Emulsion	0.085	0.05-0.08
Water	0.09-0.2	0.03-0.07

Owing to their low thermal conductivity, laminated bearings must, however, be adequately water-cooled to prevent charring of the bearing surface. The author gave some interesting figures on the reduction in power consumption by using laminated bearings—a reduction of 25-50 per cent. has been reported. Further, 6-10 times longer life of the bearings and 25 per cent. increase of output for roller mills is claimed.

The third group of materials the author described is comparatively new to this country, although widely used under the name of "Wolff" and "Pe-Te-Presstoff" in Germany. It is a product of felt-like structure obtained by impregnating fibrous fillers, such as cellulose fluff, linters, etc., just when felt formation—a process well known in paper-making—has started.

The resin is generally precipitated from a thin aqueous solution (e.g., caustic soda) on and in the felt-forming fibres. In Great Britain manufacture, using emulsified resins, has begun. This material is especially interesting, as it can be made to flow into intricate moulds to form a homogeneous structure of great strength. Its use for bearings is indicated.

Comparative coefficients of friction are:—

Lubricant.	Brass.	Group 3 Material.
Grease	0.1	0.1-0.15
Oil	0.06	0.045-0.075
Emulsion	0.085	0.07
Water	0.09-0.2	0.02-0.07

The treatment of such materials by dispersion with graphite and their use for bearings was also discussed.

Mr. H. W. Rowell, of Ellison Insulations, Ltd., in his paper on "The Lubrication of Laminated Synthetic Resinoid Bearing Materials," gave an illuminating description of the new substances and of their properties during lubrication.

At first sight, he said, it seems absurd to use an efficient brake-shoe lining as a bearing surface. When dry the material has a coefficient of friction equal to that of good automobile brake linings. When lubricated with water, however, the coefficient of friction is much lower than that of metals lubricated with water if test conditions are the same.

The reason for the superiority of synthetic-resinoid bearing material over metal lies in the fact that it is a composite of organic fibres and hard resinoid, which will absorb water but not oil and grease. The fibres absorb the water, while the resinoid does not, this absorption at a machined surface being about 0.03 oz. to 0.05 oz. per sq. ft. in 24 hours. Immersion during several months is required to wet the fibre lying $\frac{1}{2}$ in. below the surface.

The author describes the action of lubrication as follows: The working surface of a laminated material is unlike a polished metal surface, in that it consists largely of a forest of microscopical cellulose fibres impregnated with water. A force greater than that produced in a heavy bearing would be required to squeeze the water out of these fibres. The "trees" in this forest are not more than 1/1,000 in. or 2/1,000 in. high and about 1/10,000 in. thick. Under heavy loads the vertical fibres are probably bent over and laid flat, so that a tough, jelly-like mat of wet elastic fibre forms the face of one of these bearings in operation. Water is also held between the fibres by the strong forces of surface tension or capillary attraction, and the films thus formed assist in retaining the mobile lubricating film of water above them.

NEW DEVELOPMENT IN SYNTHETIC RESIN FOR CANNING

It is only within recent years that synthetic resins have been used for lining food cans, and considerable progress has been maintained in the selection of the right type of resin and the method of application. A new and promising method enables a phenol-formaldehyde resin, free from fixed oils, to be dissolved in a suitable solvent and applied either to the manufactured container or the metal sheet. The coating is then baked for 18 minutes to 25 minutes at 370-400 degrees F., to drive off the volatile solvents and render the resin insoluble. A suitable composition consists of a phenol-aldehyde resin and dimethyl phthalate dissolved in butanol, ethanol or solvent naphtha.

Inquiries and Answers

Cellulose-acetate Tubes

Chelmsford.

To the Editor, *Plastics*.

Sir,—As a designer and maker of Biological Teaching Models I have found your journal extremely helpful in enabling me to find a solution to the problem of producing certain special models in a transparent medium. These promise to be very successful, but in the design of yet others I find I am badly handicapped through inability to obtain the material I need for experimental purposes. So far the models in question have necessitated only the use of cellulose acetate in sheet form, but for some proposed new ones I require this material in the form of transparent, colourless, rod and tube. I have approached several of your advertisers in the hope of being able to obtain supplies, but have found in each case that either material is practically unobtainable except when made specially to order, and this, of course, entails its purchase in large quantities. Since my requirements are limited to small quantities of several different gauges, I wonder if you could suggest any channel through which such supplies could be purchased? I have found no difficulty in obtaining non-flam cellulose acetate in sheet form and cannot understand why the rod and tube should not also be purchasable on the same scale. I should be grateful for any advice you can give me on this point.

W.J.B.

[EDITOR'S NOTE.—Extruded tubes of transparent, colourless cellulose acetate are available in various sizes from Erinoid, Ltd., The British Xylonite Co., Ltd., and May and Baker, Ltd. Small quantities are difficult to get, but it would seem reasonable to arrange that, when large supplies are being made, some be retained for you. As the tube and rod forms are not normally on the market and only made to special requirements for industry, stocks cannot usually be held. On the other hand, depending on the diameter of the tube and the thickness of the wall, it should be possible to make your own tubes on a cylindrical former, if you did not object to a lap joint. This could normally be done by using acetone or other suitable solvent placed on the edge and pressing the other end on to it. Of course, if you require a thick-walled tube, this process would not be of much use.]

Plastics for Matrices

Plymouth.

To the Editor, *Plastics*.

Sir,—We are emboldened to ask you if you can inform us where we can obtain a plastic that can be simply manipulated for producing a flexible matrix, one that can be strained or stretched away from undercut portions of the casting without breaking. The objects cast would be self-setting without heat, similar to ordinary cement.

A.E.B.

[EDITOR'S NOTE.—We presume that ordinary wax mixtures and plasters are not sufficiently strong for the purpose and that what is needed is a type of cement in which the process of hardening is so slowed down that it can be pulled away from the casting and yet hardened after a short period. There is no synthetic resin, so far as we know, that would do the job without heat-hardening, but some bright person might evolve one, by some such process as mixing a water-soluble synthetic resin with plaster of paris or cement. We think the problem should be solved by Plastone, a product of Harbutts, Ltd., 56, Ludgate Hill, London, E.C.4. This plastic material hardens up very well after an hour or so, but is strong enough to be removed while soft. Perhaps the reader will approach this company and let us know the results.]

Zuric, Ltd.

In answer to many inquiries, the address of this company is: 27, Old Bond Street, London, W.1.

Luminous Plastics

Birmingham.

To the Editor, *Plastics*.

Sir,—With reference to your article luminous plastics in your October issue of *Plastics*, the problem of luminous dials has been a trouble for a long time owing to the expense of radio-active luminous paints, also the application has its difficulties, the markings and letters having to be keyed in black to make this readable in daylight. The barium sulphides, etc., are not favoured on account of their properties of having to absorb light in order to emit rays in the dark. In short, the results are not worth the expense of application. You will readily understand our interest, when with the new luminous powder being incorporated in plastics it may make this a commercial success. We should esteem it a favour if you could let us have the name and address of the suppliers of this material, so that we may make some tests.

J.C. AND SON, LTD.

[EDITOR'S NOTE.—It is unfortunately true that the most efficient raw materials for producing luminous products—the radio-active elements—are, for most purposes, expensive. Also it is true that the barium sulphides and similar products, which are relatively cheap, have the drawback of requiring exposure to light before they can emit rays in the dark. Hence all the applications for the latter, we presume, are either out-of-doors or in situations where strong electric light is normally close to the luminous object. We suppose it is true that a clock kept in a semi-dark room would not give very good results.

The inquirers would be interested in the new method shown on our "Ideas" page of extruding dial figures. There would be no difficulty in using the luminous powder for this purpose, as, we believe, the examples shown in our last issue were of thermoplastic material. If a dark-coloured dial were employed the light-coloured numbers would be visible in daytime without any keying in black. So far the only manufacturers we have encountered are:—Sobelrecol, 66, Avenue De L'Observatoire, Liège, Belgium; and Société des Produits Luminescents, 24, Rue Vernet, Paris. Mr. G. Noble, 10, Ranelagh Drive, Edgware, Middlesex, is, we understand, able to provide "luminous" moulding powder to potential users in this country. It is similar to the French product.]

Home-recording Discs

Highams Park.

To the Editor, *Plastics*.

Sir,—I was particularly interested in the references to home-recording discs in the October issue of your periodical and should like to add my plea to that of your correspondent for further information about the manufacture of synthetic blanks, especially of the thermo-setting-resin type.

I have successfully used all three of the types you describe and have found the thermo-resin type most generally useful on account of their durability when baked and the lack of special precaution needed over playback. The gelatine types probably take a wider frequency response, but special care must be taken over playback if anything like a reasonable life is to be obtained from them. The cellulose-acetate type have a short life.

Unfortunately, I am told that the manufacture of thermo-resin discs has ceased—I used Dralowid (German) discs, purchased through their London agents Musikon, Ltd.—and so any information which would enable me to prepare these would be very welcome.

I have a considerable knowledge of chemistry and should have no difficulty with the chemical manipulation of the process if I could get a good idea what to use.

I once gathered that direct-recording blanks were prepared by pouring the compound in a liquid state or in solution (e.g., cellulose acetate in amyl acetate) on to the disc while it was rotating very slowly (about 5 revs. per min.) on an accurately level turntable and allowing to set. Perhaps you could confirm or correct this hypothesis. W.G.C.

[EDITOR'S NOTE.—Cellulose acetate without plasticiser would not give good results, while the number of revolutions is too low.]

Jointing Plastics

London.

To the Editor, *Plastics*.

Sir,—What are the usual methods for joining pieces of moulded goods and other plastic materials together so that a perfect union is formed? S.S.G.

[EDITOR'S NOTE.—Each material must generally be treated according to its own physical or chemical characteristics. So far as we know it is impossible to join Bakelite or amino-resin moulded goods so that a perfect joint is made. We presume the reader refers to something equivalent to a welding process. If properly cured these resins no longer flow, and no heating or pressure will join two pieces together. Equally, the finished material is insoluble, so that no method by solution seems possible. Of course, two pieces can be joined together by adhesives just as broken "china," and two sheets can be made to adhere to one another very effectively, but we presume the inquirer does not refer to this type of joint.

With thermo-plastic materials, such as cellulose acetate, the problem is simpler. Usually good solvents are available; for example, acetone with a small quantity of ethyl lactate in it to prevent rapid evaporation is very effective. When applied to cellulose acetate sheets it dissolves the material, so that two pieces can be "welded" together. For some thermo-plastics such solvents are available. A "welding" together by heat is rarely practised and is not always successful. This cannot be done very successfully with cellulose acetate, but good results have been obtained with some vinyl resins.]

Kallodent Resin

To the Editor, *Plastics* Walsall.

Sir,—Can you give me any further details of this resin, which was mentioned in your August issue for use in making dentures? J.S.

[EDITOR'S NOTE.—The following data may be of use. Further information may be had from Imperial Chemical Industries, Ltd. (Mouldrite, Ltd.).]

General

This material is a single organic resin of the acrylic type, wholly synthetic.

No change in dimensions of dentures after immersion in water at 20° C. for 30 days.

Effect of exposure to ultra-violet light — No effect in 480 hours.

Mechanical

Tensile strength	3.2 tons/sq. in.
Impact strength at 20° C. (Izod cut notch) ...	3.1 kg. cms. (on specimen in accordance with B.S.S. 488).
Modulus of elasticity at 20° C.	200 tons/sq. in.
Hardness	20 Brinell.

Thermal

Coefficient of expansion per °C. between +20° C. and +60 °C.	69×10^{-6}.

Acetate Scrap

Whitley Bay.

To the Editor, *Plastics*.

Sir,—I shall be pleased to hear, through the medium of your "correspondence columns," if there is any method of economically using up or making into sheets of a lower grade, waste sheet cellulose-acetate and/or celluloid scrap. In a project which I have in view, the waste from cutting sheet into the required size amounts to approximately 43 per cent. and is a serious handicap to the economical production of the article. H.D.W.

[EDITOR'S NOTE.—It is possible, under certain conditions, to regenerate cellulose-acetate scrap into sheet, but we do not think it is the job of the fabricator of articles from it, unless he is an expert in the material. Cellulose acetate often varies greatly in composition, according to the pigments, fillers and plasticisers that have been used in the manufacture. If the fabricator uses one source of supply, and if he can segregate colours of the waste material, it would prove simpler. By examination it might be found that, by replasticising, new sheet could be made or, alternatively, it might be worth while turning it into a moulding powder. This, obviously, is the job of the manufacturer of cellulose acetate. If large quantities were available it would be certainly worth while getting into touch with your suppliers.]

General Trade Inquiry

We have received the following letter from W. Fehmer, Dammweg No. 3, Heidelberg-Wieblingen, Germany: "Your address has been given to me by H.M. Consul-General of Frankfurt-on-Main. I am resident in Buenos Aires (Argentine) in the building-trade supply business, so that I am interested in any new British synthetic-resin wall coverings, splash-backs and all kinds of laminated sheets for indoor use as construction material. I am also interested in amino-plastic plates, etc., for refrigerators. I should feel obliged for names and addresses of first-class British manufacturers." Will interested readers write direct.

TRADE AND PERSONAL NOTES

Association of British Chemical Manufacturers

The annual meeting was held on October 14, with Mr. Eben Wallace in the chair.

The following officers were elected for the ensuing year at the annual general meeting and at the council meeting immediately following:—

President: Dr. F. H. Carr, C.B.E.,

Vice-presidents: Dr. E. F. Armstrong, F.R.S., J.P.; Dr. Charles Carpenter, C.B.E., M.Inst.C.E.; Mr. C. A. Hill, B.Sc., F.I.C.; Sir David Milne-Watson, Bt., D.L., LL.D.; Messrs. R. G. Perry, C.B.E., and E. Wallace.

Council chairman: Mr. E. V. Evans, O.B.E., F.I.C.

Vice-chairman: Mr. R. Duncalfe.

Honorary treasurer: Mr. C. F. Merriam.

The Secretary of the **Department of Scientific and Industrial Research** announces that the Lord President of the Council has appointed Mr. G. M. B. Dobson, D.Sc., F.R.S., Lieut.-Colonel J. H. M. Greenly, C.B.E., and Mr. S. K. Thornley to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research. Professor A. Fowler, C.B.E., F.R.S., Sir Clement D. B. Hindley, K.C.I.E., M.Inst.C.E., and Mr. T. Franklin Sibly, D.Sc., have retired from the Council upon the completion of their terms of office.

Developments in Japanese Plastics Trade

Toyo Kasei Kogyo, formerly Tanaka Paints, announces the successful development of a process by which silkworm droppings are used in artificial-resin manufacture as a substitute for formalin.

The Kamata and Osaka plants of Toyo Kasei are to adopt the new process following the completion of an extension at present under way.

Nippon Bakelite, Ltd., is turning to the manufacture of powder for phenol plastics owing to the development of the phenol-resin trade in recent months.

The important Formosa Chemical Industry of the Nissan Group is negotiating for the license of a new American process for methane-gas cracking for the production of urea and synthetic methanol. Formaldehyde is also to be produced on a large industrial scale.

New Bitumen Works

Stirling's Bitumen Products, Ltd. (Victoria Chemical Works, McGown Street, Paisley), the managing director of which, Mr. W. T. Stirling, was previously associated with Briggs and Sons, Ltd., Dundee, as chief chemist and works manager, have acquired the works formerly known as the Victoria Foundry, Paisley. The company will specialize in bituminous plastics.

Brinell Hardness Testing

The British Standards Institution has issued a revision of B.S. No. 240, relating to Brinell Hardness Testing. Copies of the revised specification may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, S.W.1, price 2s. 2d. post free.

Dr. J. J. Fox, Government analyst, is a member of the new committee appointed by the Home Secretary "to inquire into the use of celluloid and any similar highly inflammable material in the manufacture of toys, fancy goods, articles of attire, toilet requisites, etc., and to consider what steps are desirable and practicable against the danger arising to the public, and especially to children, from such use."

Increase in Italian Output of Alcohol

In view of the interest now taken by Fascist Italy in the production of synthetic rubber, it is interesting to read the latest statistics published by the Italian fiscal authorities regarding the production of alcohol in 1936. This amounted to 29,000,000 gallons, against 13,680,000 gallons in 1935.

Mouldings Sales Manager for E. K. Cole, Ltd.

Extensive development of the mouldings side of their business is foreshadowed by the appointment of Mr. H. Vic. Verrells as mouldings sales manager of E. K. Cole, Ltd.

E. K. Cole, Ltd., first installed moulding plant in their Southend-on-Sea radio factory in 1931, and immediately commenced production from four of the largest presses erected in this country up to that date.

Since that time they have concentrated mainly on supplying large cabinets for the Ekco radio sets made by the same company. The consumption of these cabinets, all of large dimensions, has exceeded 100,000 yearly from a single design, and the overall output of various mouldings runs into many millions annually.

Mr. H. Vic. Verrells.

Since the original installation many extensions have been made to their plant which have permitted them to accept large outside contracts. It is now intended actively to develop this market.

Mr. Vic. Verrells stresses that a Designs Advisory Service is available to those interested and quotations for any type of mouldings can be prepared at short notice.

The **Synthetic Resin Manufacturers' Association** has appointed Foster D. Snell, Inc., of New York, consulting chemists and chemical engineers, to act as the official laboratory of that association.

The fortieth annual general meeting of **Joseph Lucas, Ltd.,** was held on October 27 at the Queen's Hotel, Birmingham. Mr. Peter F. Bennett, J.P. (chairman and joint managing director), presided.

NEW MATERIALS—NEW PLANT—NEW METHODS

Improved Elevating Truck

This new truck by Matthew Wylie and Co., Ltd., of Milnpark Street, Glasgow, should prove of considerable service in moulding works, as it is specially built to stand up to the hardest work. All parts subjected to wear and strain are made extra large, so that they will give long service with

the minimum of wear. The front swivel bracket carries two wheels, which add to the stability of the truck, and all wheels are fitted with roller bearings, enabling heavy loads to be moved with little effort. The truck is fitted with hydraulic resistance, allowing the heaviest load to lower gently to the floor, and the fluid used in the cylinder of same is not affected in cold weather and will not freeze.

Synthetic Resins for Gas-impermeable Fabrics

T. P. Sager, working in the laboratory of the U.S. National Bureau of Standards, has published an account of the work done on rendering fabrics impermeable to hydrogen gas. The lowest permeabilities are obtained with products containing four sulphur atoms in the primary molecule. Comparison with films of natural rubber shows that for both the disulphide and tetrasulphide derivatives a much lower permeability is obtained with these products (up to 50 times). The resins were the di- and tetrasulphide derivatives obtained by the reaction of 2-2' dichloroethyl ether and sodium polysulphide. Since these resins can be dispersed in solvents to form cements, they should find important applications for coating airship fabrics.

Yellowing of Celluloid in Light

Recent work carried out on this problem, particularly by Dr. P. Trevy, France, appears to indicate that the yellowing of celluloid films on exposure to light is associated with both physical and chemical properties, such as permeability to water, and the extent of discoloration varies according to type of light, this being most active at 3,000-3,500 A. Apparently impurities in the nitrating mixture, the nitrocellulose and the plasticizers, as well as the purity of the cellulose, are all liable to affect the stability of the celluloid.

A Novel Moisture Testing Method for Plastics Ingredients

The Brabender Method consists in drying up to 10 samples of 10 grs. each of material in a cylindrically shaped drying chamber (Fig. 1). A fan is arranged to force hot air into the drying chamber through the heating element, which is arranged below the oven, with a view to circulating hot air in the drying chamber. This results in absolutely uniform temperatures being obtained throughout the oven, which, as well known to many readers, is difficult to obtain in drying ovens containing several drying shelves where, furthermore, in many cases no fan is applied to distribute the heat evenly. The fan also expedites the drying process considerably, as the hot air in the drying chamber is constantly renewed and discharges the evaporated moisture through outlets which are arranged in the top part of the oven.

Fig. 1. The Brabender Testing Oven.

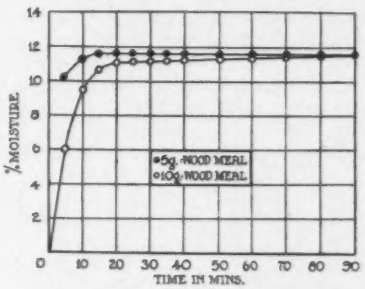


Fig. 2. Graph showing the rapidity with which the moisture content is estimated by the Brabender Method.

After a very short drying period, the sample is weighed in the oven by means of a precision balance, which is arranged underneath the drying chamber, and the actual loss of weight is indicated in moisture per cent. on an illuminated scale. The plate on which the 10 samples are placed can be rotated and each sample can be weighed separately. Tests on wood-flour at a temperature of 130° C. resulted in constant weight being obtained after approximately 20 minutes. The same drying time of 20 minutes is sufficient to obtain constant weight on powdered coal at a temperature of 105° C.

One of the outstanding features of the Brabender Testing Oven is its use for research purposes. Whereas it takes hours to obtain drying curves with ordinary drying oven methods, the Brabender Semi-Automatic Method enables curves to be obtained while the drying process is taking place. The moisture content figures may be read off the scale every five or ten minutes, and if registered as a curve, give an indication as to when constant weight was obtained, and if so, when decomposition set in. This feature of the Brabender Method will be of considerable interest to artificial resins and allied manufacturers, in view of the continuous experiments being carried out on new plastics ingredients.

The Eirich mixer showing the interior mechanism, rollers, blades and outlet for the finished mixed compounds.

Counter-current Rapid Mixer.

It is worth while to call the attention of our readers to a relatively new and modern mixing process using a type of mixer which really deserves the name of a universal mixer, because an outstanding homogeneity of the mixing will be achieved, whether mixings are of a dry, wet, plastic or pasty sticking consistency.

The drawing below shows the planitary action of the modern mixing method, which is called "counter-current rapid mixing." The illustration above depicts the mixing mechanism. The mixing machines are of German origin and have recently been introduced here by Pragos Engineering Co., Ltd., 351, Brixton Road, London, S.W.9. Although planitary mixing

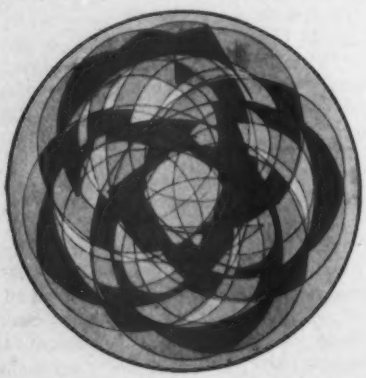


Diagram showing the planitary mixing movement.

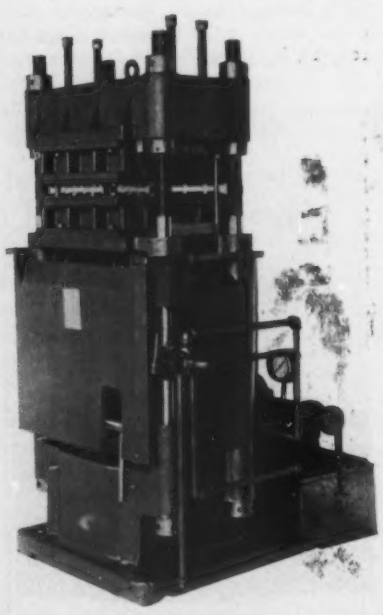
movements are not new, the type under discussion is claimed to be superior to other machines already on the market. A special feature of these mixers is the easy exchange of the mixing tubes in form of specially shaped blades, knives and rollers. The vertical shaft can be raised or lowered whilst in operation. A combination of rollers and blades is particularly useful if fibrous materials such as fluff or asbestos are mixed with resins or bitumens or emulsions of these materials. The mixing pan can be fitted with heating and cooling systems.

The mixer has, furthermore, found use for the ceramics industry and for mixing of abrasive materials with a binder. The mixer avoids sliding and unwanted disintegration, allows a constant observation and the taking of test samples during the mixing period. Open and enclosed types can be supplied. The mixing stars are provided with spring-mounted, manganese, steel tools. The counter-current action is obtained by the two-fold contrary movements of the slowly rotating pan and the counter action of the quick-rotating mixing star or stars.

Standard Self-contained Moulding Presses

These presses have proved most efficient, because, first, they can be installed at low cost for self-contained units; second, they are faster in operation and automatic in closing; and, third, they are run at low operating cost of 1 kilowatt-hour per 100 tons of pressure.

A triple toggle hydraulically operated, four-rod press, platen-type vertically upward acting, is driven by a 3 h.p. motor and rotary two-stage pump, high and low pressure. The hydraulic cylinder and ram are located in the centre of the press. The operation of the press is controlled by the single lever on the four-way valve, located on the right-hand side of the press, as shown in the photograph. The press closes under low pressure, normally set at 150-200 lb. pressure, both pumps operating. As the press closes on the material when a predetermined pressure is reached, the low-pressure pump automatically cuts out and the high-pressure pump carries the pressure up to the predetermined point, namely, 600 lb. pressure per sq. in., when the maximum pressure of 100 tons is applied on the platen. The pump then maintains this pressure indefinitely until the moulding operation is completed and the operator is ready to open the press. Although the pump is capable of exerting 1,000 lb. pressure per sq. in., the high-pressure pump has a by-pass relief valve, which, when set at 600 lb. pressure, releases at that point and the fluid by-pass, maintaining however, the constant pressure of 600 lb. per sq. in.



The 150-ton press.

The hydraulic cylinder is double acting, thus eliminating use of pull-backs on the press. The operator opens the press by pushing the valve handle away from him as far as it goes and the oil enters the top of the cylinder and opens the press.—The Standard Machinery Co., New York.

Foaming in Casein Manufacture

In the manufacture of low-foaming, acid-precipitated casein, the addition of diglycol laurate to the milk materially reduces the foam index of the finished casein. Diglycol laurate is not strained off with the whey, nor does it volatilize under the conditions of drying the casein. It is not absolutely necessary to add it to the milk. If desired, it can be added to the casein directly. In this case, it has been found that less than one-tenth of 1 per cent. reduces the foam index considerably. In many cases, to zero.

Diglycol laurate is a light-coloured edible liquid, easy to handle and store. It does not deteriorate or spoil, even on long storage.

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The Technical Service Library, 10, Cross Lane, E.C.3, has sent us their latest catalogue of books and pamphlets dealing with paints, lacquers and plastics now available to anyone interested. Mr. K. S. Burch is technical adviser to the library.

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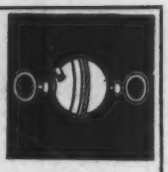

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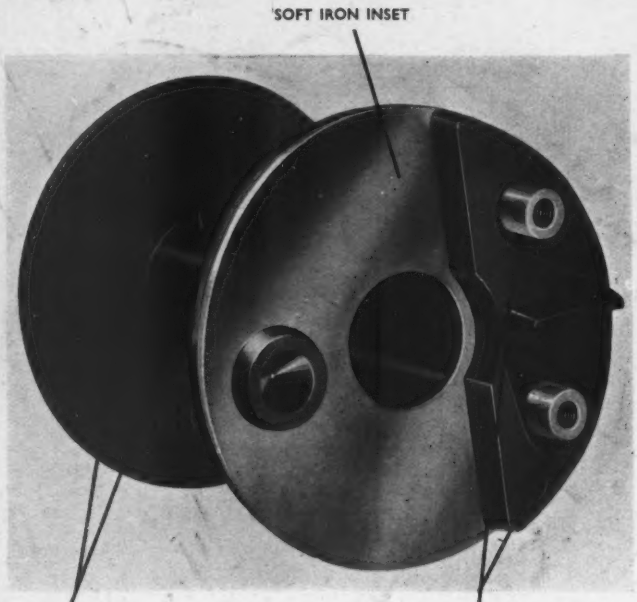

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